

LOST TEMPLE FITNESS

Diabetes Exercise Benefits & Precautions

Plus Home Exercise and Nutrition Guide

This is the fifth book on home exercise and fitness guides. This book includes an extra chapter on Diabetes, including exercise benefits and precautions. It has been proven that exercise and nutrition are two of the main factors that you can control for a healthy lifestyle. Many people do not know how to start or progress an exercise program. There are hundreds of pictures for beginner, intermediate and advanced exercise programs, as well as a list of equipment that you can use in the home.

“Diabetes is a disease that occurs when your blood glucose, also called blood sugar, is too high. Over time, having too much glucose in your blood can cause health problems, such as heart disease, nerve damage, eye problems, and kidney disease. You can take steps to prevent diabetes or manage it. An estimated 30.3 million people in the United States, or 9.4 percent of the population, have diabetes. About one in four people with diabetes don’t know they have the disease. An estimated 84.1 million Americans aged 18 years or older have prediabetes”. (NIH – National Institute of Diabetes and Digestive and Kidney Diseases (2022)).

Most of the diabetes research is from NIH – National Institute of Diabetes and Digestive and Kidney Diseases.

Please see *References* for links.

***This book is not meant to substitute an exercise program prescribed by a health care professional but designed to accompany their recommendations.
Please consult with your physician before starting any exercise program.***

This book is for:

- Those with a diagnosis of diabetes, pre-diabetes or metabolic disorders.
- The beginner who has never exercised before
- The individual that has mastered the basics but wants to know how to advance to the next level.
- Pre/post rehab individuals who would like to advance or want a list of exercise programs to follow.
- The personal trainer, physical therapist, or other coaches who would like their client to have a list of exercises that can be progressed.

This book is not for or may need modification:

- Chronic or acute disorders/injury’s that is not being followed by a health care professional. This book can be used in conjunction with a rehab program.
- If you are over 40 and have never exercises before, it is advised that a physician clears you first.
- Undiagnosed pain
- The person that does not feel they can safely modify their individual program, although can be used in conjunction with rehab or coaches/personal trainers.
- People with the following issues that have been cleared by an MD for an exercise program or in conjunction with rehab. These issues will be addressed in future volumes: Cardiopulmonary, Cancer, Arthritis, Autoimmune disorders, Neurological disorders, Orthopedic disorders

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What is covered in this book?

- Diabetes, including Type 1, Type 2, Gestational Diabetes, Diabetic Neuropathy, Foot problems, Insulin and other Treatments, Physical Activity and Diet
- Benefits and Factors to consider before starting an exercise program
- Vital signs and how to monitor exercise intensity
- Anatomy
- Temperature – Heat and Cold
- Dehydration
- Equipment needed for home exercise
- Warm up/cool down
- Duration, Frequency, Intensity and Primary Movement Patterns
- Home Exercise Programs – pictures and explanations
 - Myofascial release
 - Flexibility – Stretching
 - Core Stability
 - Balance with progression to Standing Strengthening exercises
 - Strengthening
 - Lower extremity - Lying and Seated
 - Upper extremity
- Nutrition
 - Protein, Amino Acids, Fats
 - Carbohydrates, sugars, glycogen, glycemic index
 - Vitamins and Minerals
 - Calories
 - How to read a nutrition label

Diabetes Table of Contents

Information from NIH – National Institute of Diabetes, Digestive and Kidney Diseases unless otherwise indicated.

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Diabetic Neuropathy

- Peripheral Neuropathy

Diabetes and Foot Problems

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- Keeping your feet healthy
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- When should I eat and how much can I eat?
- Weight-loss planning and meal plan methods

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Some Definitions

<p>Diabetic ketoacidosis (DKA)</p> <p><i>MedLine Plus</i></p>	<p>Diabetic ketoacidosis (DKA) is a life-threatening problem that affects people with diabetes. It occurs when the body starts breaking down fat at a rate that is much too fast. The liver processes the fat into a fuel called ketones, which causes the blood to become acidic.</p> <p>Causes</p> <p>DKA happens when the signal from insulin in the body is so low that:</p> <ul style="list-style-type: none">• Glucose (blood sugar) can't go into cells to be used as a fuel source.• The liver makes a huge amount of blood sugar.• Fat is broken down too rapidly for the body to process. <p>The fat is broken down by the liver into a fuel called ketones. Ketones are normally produced when the body breaks down fat after a long time between meals. When ketones are produced too quickly and build up in the blood and urine, they can be toxic by making the blood acidic. This condition is known as ketoacidosis.</p> <p>DKA is sometimes the first sign of type 1 diabetes in people who have not yet been diagnosed. It can also occur in someone who has already been diagnosed with type 1 diabetes. Infection, injury, a serious illness, missing doses of insulin shots, or surgery can lead to DKA in people with type 1 diabetes.</p> <p>People with type 2 diabetes can also develop DKA, but it is less common and less severe. It is usually triggered by prolonged uncontrolled blood sugar, missing doses of medicines, or a severe illness or infection.</p>
<p>Insulin</p>	<p>What is insulin?</p> <p>Insulin is a hormone made by the pancreas that helps glucose in your blood enter cells in your muscle, fat, and liver, where it's used for energy. Glucose comes from the food you eat. The liver also makes glucose in times of need, such as when you're fasting. When blood glucose, also called blood sugar, levels rise after you eat, your pancreas releases insulin into the blood. Insulin then lowers blood glucose to keep it in the normal range.</p> <p>What is insulin resistance?</p> <p>Insulin resistance is when cells in your muscles, fat, and liver don't respond well to insulin and can't easily take up glucose from your blood. As a result, your pancreas makes more insulin to help glucose enter your cells. As long as your pancreas can make enough insulin to overcome your cells' weak response to insulin, your blood glucose levels will stay in the healthy range.</p>
<p>Ketones</p> <p><i>WebMD</i></p>	<p>Everyone has ketones, whether you have diabetes or not. Ketones are chemicals made in your liver. You produce them when you don't have enough insulin in your body to turn sugar (or glucose) into energy. You need another source, so your body uses fat instead.</p> <p>Your liver turns this fat into ketones, a type of acid, and sends them into your bloodstream. Your muscles and other tissues can then use them for fuel.</p> <p>For a person without diabetes, this process doesn't become an issue. When you have diabetes, however, you can build up too many ketones in your blood -- and too many ketones can become life-threatening.</p>

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Diabetes	
What is Diabetes?	<ul style="list-style-type: none"> • Diabetes is a disease that occurs when your blood glucose, also called blood sugar, is too high. Blood glucose is your main source of energy and comes from the food you eat. Insulin, a hormone made by the pancreas, helps glucose from food get into your cells to be used for energy. Sometimes your body doesn't make enough—or any—insulin or doesn't use insulin well. Glucose then stays in your blood and doesn't reach your cells. • Over time, having too much glucose in your blood can cause health problems. Although diabetes has no cure, you can take steps to manage your diabetes and stay healthy. • Sometimes people call diabetes "a touch of sugar" or "borderline diabetes." These terms suggest that someone doesn't really have diabetes or has a less serious case.
Types of diabetes	<p>Type 1 diabetes</p> <ul style="list-style-type: none"> • If you have type 1 diabetes, your body does not make insulin. Your immune system attacks and destroys the cells in your pancreas that make insulin. • Type 1 diabetes is usually diagnosed in children and young adults, although it can appear at any age. • People with type 1 diabetes need to take insulin every day to stay alive. <p>Type 2 diabetes</p> <ul style="list-style-type: none"> • If you have type 2 diabetes, your body does not make or use insulin well. • You can develop type 2 diabetes at any age, even during childhood. However, this type of diabetes occurs most often in middle-aged and older people. • Type 2 is the most common type of diabetes. <p>Gestational diabetes</p> <ul style="list-style-type: none"> • Gestational diabetes develops in some women when they are pregnant. • Most of the time, this type of diabetes goes away after the baby is born. However, if you've had gestational diabetes, you have a greater chance of developing type 2 diabetes later in life. • Sometimes diabetes diagnosed during pregnancy is actually type 2 diabetes. <p>Other types of diabetes</p> <ul style="list-style-type: none"> • Less common types include monogenic diabetes and cystic fibrosis-related diabetes.
Health problems related to diabetes	<p>Over time, high blood glucose leads to problems such as:</p> <ul style="list-style-type: none"> • Heart disease • Stroke • Kidney disease • Eye problems • Dental disease • Nerve damage • Foot problems
Symptoms	<p>Symptoms of diabetes include:</p> <ul style="list-style-type: none"> • Increased thirst and urination • Increased hunger • Fatigue • Blurred vision • Numbness or tingling in the feet or hands • Sores that do not heal • Unexplained weight loss <p>Symptoms of type 1 diabetes can start quickly, in a matter of weeks. Symptoms of type 2 diabetes often develop slowly—over the course of several years—and can be so mild that you might not even notice them. Many people with type 2 diabetes have no symptoms. Some people do not find out they have the disease until they have diabetes-related health problems, such as blurred vision or heart trouble.</p>

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<p>Other Causes</p> <p><i>See Type 1, Type 2 and Gestational sections for specific causes</i></p>	<p><i>Genetic mutations</i></p> <ul style="list-style-type: none">• Monogenic diabetes is caused by mutations, or changes, in a single gene. These changes are usually passed through families, but sometimes the gene mutation happens on its own. Most of these gene mutations cause diabetes by making the pancreas less able to make insulin. The most common types of monogenic diabetes are neonatal diabetes and maturity-onset diabetes of the young (MODY). Neonatal diabetes occurs in the first 6 months of life. Doctors usually diagnose MODY during adolescence or early adulthood, but sometimes the disease is not diagnosed until later in life.• Cystic fibrosis produces thick mucus that causes scarring in the pancreas. This scarring can prevent the pancreas from making enough insulin.• Hemochromatosis causes the body to store too much iron. If the disease is not treated, iron can build up in and damage the pancreas and other organs. <p><i>Hormonal diseases</i></p> <p>Some hormonal diseases cause the body to produce too much of certain hormones, which sometimes cause insulin resistance and diabetes.</p> <ul style="list-style-type: none">• Cushing’s syndrome occurs when the body produces too much cortisol—often called the “stress hormone.”• Acromegaly occurs when the body produces too much growth hormone.• Hyperthyroidism occurs when the thyroid gland produces too much thyroid hormone. <p><i>Damage to or removal of the pancreas</i></p> <ul style="list-style-type: none">• Pancreatitis, pancreatic cancer, and trauma can all harm the beta cells or make them less able to produce insulin, resulting in diabetes. If the damaged pancreas is removed, diabetes will occur due to the loss of the beta cells. <p><i>Medicines</i></p> <p>Sometimes certain medicines can harm beta cells or disrupt the way insulin works. These include</p> <ul style="list-style-type: none">• Niacin, a type of vitamin B3• Certain types of diuretics, also called water pills• Anti-seizure drugs• Psychiatric drugs• Drugs to treat human immunodeficiency virus (HIV)• Pentamidine, a drug used to treat a type of pneumonia• Glucocorticoids—medicines used to treat inflammatory illnesses such as rheumatoid arthritis , asthma , lupus , and ulcerative colitis• Anti-rejection medicines, used to help stop the body from rejecting a transplanted organ <p>Statins, which are medicines to reduce LDL (“bad”) cholesterol levels, can slightly increase the chance that you’ll develop diabetes. However, statins help protect you from heart disease and stroke. For this reason, the strong benefits of taking statins outweigh the small chance that you could develop diabetes.</p>
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Type 1	
<p>What is Type 1 diabetes?</p> <p>Who is more likely to develop type 1 diabetes?</p>	<ul style="list-style-type: none"> • Diabetes occurs when your blood glucose, also called blood sugar, is too high. Blood glucose is your main source of energy and comes mainly from the food you eat. Insulin, a hormone made by the pancreas, helps the glucose in your blood get into your cells to be used for energy. Another hormone, glucagon, works with insulin to control blood glucose levels. • In most people with type 1 diabetes, the body’s immune system, which normally fights infection, attacks and destroys the cells in the pancreas that make insulin. As a result, your pancreas stops making insulin. Without insulin, glucose can’t get into your cells and your blood glucose rises above normal. People with type 1 diabetes need to take insulin every day to stay alive. <p><i>Who is more likely to develop type 1 diabetes?</i></p> <ul style="list-style-type: none"> • Type 1 diabetes typically occurs in children and young adults, although it can appear at any age. • Having a parent or sibling with the disease may increase your chance of developing type 1 diabetes. • In the United States, about 5 percent of people with diabetes have type 1.
<p>Causes</p>	<ul style="list-style-type: none"> • Type 1 diabetes occurs when your immune system, the body’s system for fighting infection, attacks and destroys the insulin-producing beta cells of the pancreas. • Scientists think type 1 diabetes is caused by genes and environmental factors, such as viruses, that might trigger the disease. • Studies such as Trial Net are working to pinpoint causes of type 1 diabetes and possible ways to prevent or slow the disease.
<p>Symptoms</p>	<p>Symptoms of type 1 diabetes are serious and usually happen quickly, over a few days to weeks. Symptoms can include:</p> <ul style="list-style-type: none"> • Increased thirst and urination • Increased hunger • Blurred vision • Fatigue • Unexplained weight loss • Sometimes the first symptoms of type 1 diabetes are signs of a life-threatening condition called diabetic ketoacidosis (DKA). <p>Some symptoms of DKA include:</p> <ul style="list-style-type: none"> • Breath that smells fruity • Dry or flushed skin • Nausea or vomiting • Stomach pain • Trouble breathing • Trouble paying attention or feeling confused <p>DKA is serious and dangerous. If you or your child have symptoms of DKA, contact your health care professional right away, or go to the nearest hospital emergency room.</p>

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Health problems related to diabetes	<p>Over time, high blood glucose leads to problems such as:</p> <ul style="list-style-type: none">• Heart disease• Stroke• Kidney disease• Eye problems• Dental disease• Nerve damage• Foot problems• Depression• Sleep apnea <p>If you have type 1 diabetes, you can help prevent or delay the health problems of diabetes by managing your blood glucose, blood pressure, and cholesterol, and following your self-care plan.</p>
Medicines Also see: <i>Insulin, Medicines, & Other Diabetes Treatments</i>	<ul style="list-style-type: none">• If you have type 1 diabetes, you must take insulin because your body no longer makes this hormone. Different types of insulin start to work at different speeds, and the effects of each last a different length of time. You may need to use more than one type. You can take insulin a number of ways. Common options include a needle and syringe, insulin pen, or insulin pump.• Some people who have trouble reaching their blood glucose targets with insulin alone also might need to take another type of diabetes medicine that works with insulin, such as pramlintide.• Pramlintide, given by injection, helps keep blood glucose levels from going too high after eating. Few people with type 1 diabetes take pramlintide, however. The NIH has recently funded a large research study to test use of pramlintide along with insulin and glucagon in people with type 1 diabetes.• Another diabetes medicine, metformin, may help decrease the amount of insulin you need to take, but more studies are needed to confirm this. Researchers are also studying other diabetes pills that people with type 1 diabetes might take along with insulin. <p>Hypoglycemia, or low blood sugar, can occur if you take insulin but don't match your dose with your food or physical activity. Severe hypoglycemia can be dangerous and needs to be treated right away.</p>

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Other ways to Manage

Along with insulin and any other medicines you use, you can manage your diabetes by taking care of yourself each day. Following your diabetes meal plan, being physically active, and checking your blood glucose often are some of the ways you can take care of yourself. Work with your health care team to come up with a diabetes care plan that works for you. If you are planning a pregnancy with diabetes, try to get your blood glucose levels in your target range before you get pregnant.

Other treatment options:

- The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) has played an important role in developing “artificial pancreas” technology. An artificial pancreas replaces manual blood glucose testing and the use of insulin shots. A single system monitors blood glucose levels around the clock and provides insulin or a combination of insulin and glucagon automatically. The system can also be monitored remotely, for example by parents or medical staff.
- In 2016, the U.S. Food and Drug Administration approved a type of artificial pancreas system called a hybrid closed-loop system. This system tests your glucose level every 5 minutes throughout the day and night through a continuous glucose monitor, and automatically gives you the right amount of basal insulin, a long-acting insulin, through a separate insulin pump. You still need to manually adjust the amount of insulin the pump delivers at mealtimes and when you need a correction dose. You also will need to test your blood with a glucose meter several times a day. Talk with your health care provider about whether this system might be right for you.
- The continuous glucose monitor sends information through a software program called a control algorithm. Based on your glucose level, the algorithm tells the insulin pump how much insulin to deliver. The software program could be installed on the pump or another device such as a cell phone or computer.
- The devices may also help people with type 2 diabetes and gestational diabetes.
- NIDDK is also supporting research into pancreatic islet transplantation—an experimental treatment for hard-to-control type 1 diabetes.
- Pancreatic islets are clusters of cells in the pancreas that make insulin. Type 1 diabetes attacks these cells. A pancreatic islet transplant replaces destroyed islets with new ones that make and release insulin. This procedure takes islets from the pancreas of an organ donor and transfers them to a person with type 1 diabetes. Because researchers are still studying pancreatic islet transplantation, the procedure is only available to people enrolled in a study.

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Type 2

What is type 2 diabetes?	<ul style="list-style-type: none">• Type 2 diabetes, the most common type of diabetes, is a disease that occurs when your blood glucose, also called blood sugar, is too high.• Blood glucose is your main source of energy and comes mainly from the food you eat. Insulin, a hormone made by the pancreas, helps glucose get into your cells to be used for energy.• In type 2 diabetes, your body doesn't make enough insulin or doesn't use insulin well. Too much glucose then stays in your blood, and not enough reaches your cells.
Causes & Risks	<p>Your chances of developing type 2 diabetes depend on a combination of risk factors such as your genes and lifestyle. Although you can't change risk factors such as family history, age, or ethnicity, you can change lifestyle risk factors around eating, physical activity, and weight. These lifestyle changes can affect your chances of developing type 2 diabetes.</p> <p><i>You are more likely to develop type 2 diabetes if you</i></p> <ul style="list-style-type: none">• Are overweight or obese• Are age 45 or older• Have a family history of diabetes• Are African American, Alaska Native, American Indian, Asian American, Hispanic/Latino, Native Hawaiian, or Pacific Islander• Have high blood pressure• Have a low level of HDL ("good") cholesterol, or a high level of triglycerides• Have a history of gestational diabetes or gave birth to a baby weighing 9 pounds or more• Are not physically active• Have a history of heart disease or stroke• Have depression NIH external link• Have polycystic ovary syndrome NIH external link, also called PCOS• Have acanthosis nigricans—dark, thick, and velvety skin around your neck or armpits <p><i>Overweight, obesity, and physical inactivity</i></p> <ul style="list-style-type: none">• You are more likely to develop type 2 diabetes if you are not physically active and are overweight or obese. Extra weight sometimes causes insulin resistance and is common in people with type 2 diabetes.• The location of body fat also makes a difference. Extra belly fat is linked to insulin resistance, type 2 diabetes, and heart and blood vessel disease.• To see if your weight puts you at risk for type 2 diabetes, check out these Body Mass Index (BMI) charts. <p><i>Insulin resistance</i></p> <ul style="list-style-type: none">• Type 2 diabetes usually begins with insulin resistance, a condition in which muscle, liver, and fat cells do not use insulin well. As a result, your body needs more insulin to help glucose enter cells.• At first, the pancreas makes more insulin to keep up with the added demand.• Over time, the pancreas can't make enough insulin, and blood glucose levels rise.

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<p>Symptoms</p> <p>Also see <i>Diabetic Neuropathy</i></p>	<p>Symptoms of diabetes include:</p> <ul style="list-style-type: none"> • Increased thirst and urination • Increased hunger • Feeling tired • Blurred vision • Numbness or tingling in the feet or hands • Sores that do not heal • Unexplained weight loss <p>Symptoms of type 2 diabetes often develop slowly—over the course of several years—and can be so mild that you might not even notice them. Many people have no symptoms. Some people do not find out they have the disease until they have diabetes-related health problems, such as blurred vision or heart disease.</p>
<p>Health problems related to diabetes</p> <p>Also see <i>Diabetes and Foot Problems</i></p>	<p>Following a good diabetes care plan can help protect against many diabetes-related health problems. However, if not managed, diabetes can lead to problems such as</p> <ul style="list-style-type: none"> • Heart disease and stroke • Nerve damage • Kidney disease • Foot problems • Eye disease • Gum disease and other dental problems • Sexual and bladder problems • Many people with type 2 diabetes also have nonalcoholic fatty liver disease (NAFLD). Losing weight if you are overweight or obese can improve NAFLD. <p>Diabetes is also linked to other health problems such as sleep apnea, depression, some types of cancer, and dementia.</p>
<p>Ways to Manage</p> <p>Also see: <i>Insulin, Medicines, & Other Diabetes Treatments</i></p>	<p>Managing your blood glucose, blood pressure, and cholesterol, and quitting smoking if you smoke, are important ways to manage your type 2 diabetes. Lifestyle changes that include planning healthy meals, limiting calories if you are overweight, and being physically active are also part of managing your diabetes. So is taking any prescribed medicines. Work with your health care team to create a diabetes care plan that works for you.</p> <p><i>What medicines do I need to treat my type 2 diabetes?</i></p> <ul style="list-style-type: none"> • Along with following your diabetes care plan, you may need diabetes medicines, which may include pills or medicines you inject under your skin, such as insulin. Over time, you may need more than one diabetes medicine to manage your blood glucose. Even if you don't take insulin, you may need it at special times, such as during pregnancy or if you are in the hospital. You also may need medicines for high blood pressure, high cholesterol, or other conditions.

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Body Mass Index (BMI)	To see if your weight puts you at risk for type 2 diabetes, find your height in the Body Mass Index (BMI) charts below. If your weight is equal to or more than the weight listed, you have a greater chance of developing the disease.					
	If you are NOT Asian American or Pacific Islander		If you are Asian American		If you are Pacific Islander	
	At-risk BMI \geq 25		At-risk BMI \geq 23		At-risk BMI \geq 26	
	Height	Weight	Height	Weight	Height	Weight
	4'10"	119	4'10"	110	4'10"	124
	4'11"	124	4'11"	114	4'11"	128
	5'0"	128	5'0"	118	5'0"	133
	5'1"	132	5'1"	122	5'1"	137
	5'2"	136	5'2"	126	5'2"	142
	5'3"	141	5'3"	130	5'3"	146
	5'4"	145	5'4"	134	5'4"	151
	5'5"	150	5'5"	138	5'5"	156
	5'6"	155	5'6"	142	5'6"	161
	5'7"	159	5'7"	146	5'7"	166
	5'8"	164	5'8"	151	5'8"	171
	5'9"	169	5'9"	155	5'9"	176
	5'10"	174	5'10"	160	5'10"	181
	5'11"	179	5'11"	165	5'11"	186
	6'0"	184	6'0"	169	6'0"	191
	6'1"	189	6'1"	174	6'1"	197
	6'2"	194	6'2"	179	6'2"	202
	6'3"	200	6'3"	184	6'3"	208
	6'4"	205	6'4"	189	6'4"	213

Prevention	<p><i>How can I lower my chances of developing type 2 diabetes?</i></p> <p>Research such as the Diabetes Prevention Program shows that you can do a lot to reduce your chances of developing type 2 diabetes. Here are some things you can change to lower your risk:</p> <ul style="list-style-type: none"> • Lose weight and keep it off. You may be able to prevent or delay diabetes by losing 5 to 7 percent of your starting weight.¹ For instance, if you weigh 200 pounds, your goal would be to lose about 10 to 14 pounds. • Move more. Get at least 30 minutes of physical activity 5 days a week. If you have not been active, talk with your health care professional about which activities are best. Start slowly to build up to your goal. • Eat healthy foods most of the time. Eat smaller portions to reduce the amount of calories you eat each day and help you lose weight. Choosing foods with less fat is another way to reduce calories. Drink water instead of sweetened beverages. <p>Ask your health care professional about what other changes you can make to prevent or delay type 2 diabetes.</p> <p>Most often, your best chance for preventing type 2 diabetes is to make lifestyle changes that work for you long term. Get started with Your Game Plan to Prevent Type 2 Diabetes.</p>
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Gestational Diabetes

<p>What is gestational diabetes?</p>	<ul style="list-style-type: none">• Gestational diabetes is a type of diabetes that develops during pregnancy. Diabetes means your blood glucose, also called blood sugar, is too high. Too much glucose in your blood is not good for you or your baby.• Usually, gestational diabetes has no symptoms. If you do have symptoms, they may be mild, such as being thirstier than normal or having to urinate more often.• Gestational diabetes is usually diagnosed in the 24th to 28th week of pregnancy. Managing your gestational diabetes can help you and your baby stay healthy. You can protect your own and your baby's health by taking action right away to manage your blood glucose levels. <p><i>Insulin resistance</i></p> <ul style="list-style-type: none">• Hormones produced by the placenta contribute to insulin resistance, which occurs in all women during late pregnancy. Most pregnant women can produce enough insulin to overcome insulin resistance, but some cannot. Gestational diabetes occurs when the pancreas can't make enough insulin.• As with type 2 diabetes, extra weight is linked to gestational diabetes. Women who are overweight or obese may already have insulin resistance when they become pregnant. Gaining too much weight during pregnancy may also be a factor.
<p>How can gestational diabetes affect my baby and/or me?</p>	<p>High blood glucose levels during pregnancy can cause problems for your baby, such as</p> <ul style="list-style-type: none">• Being born too early• Weighing too much, which can make delivery difficult and injure your baby• Having low blood glucose, also called hypoglycemia, right after birth• Having breathing problems• High blood glucose also can increase the chance that you will have a miscarriage or a stillborn baby. Stillborn means the baby dies in the womb during the second half of pregnancy.• Your baby also will be more likely to become overweight and develop type 2 diabetes as he or she gets older. <p><i>How can gestational diabetes affect me?</i></p> <ul style="list-style-type: none">• You are more likely to develop preeclampsia, which is when you develop high blood pressure and too much protein in your urine during the second half of pregnancy.• Preeclampsia can cause serious or life-threatening problems for you and your baby. The only cure for preeclampsia is to give birth. If you have preeclampsia and have reached 37 weeks of pregnancy, your doctor may want to deliver your baby early. Before 37 weeks, you and your doctor may consider other options to help your baby develop as much as possible before he or she is born.• Gestational diabetes may increase your chance of having a cesarean section, also called a C-section, because your baby may be large. A C-section is major surgery.• You are more likely to develop type 2 diabetes later in life. Over time, having too much glucose in your blood can cause health problems such as diabetic retinopathy, heart disease, kidney disease, and nerve damage. You can take steps to help Hormonal changes, extra weight, and family history can contribute to gestational diabetes. <p><i>Genes and family history:</i></p> <ul style="list-style-type: none">• Having a family history of diabetes makes it more likely that a woman will develop gestational diabetes, which suggests that genes play a role. Genes may also explain why the disorder occurs more often in African Americans, American Indians, Asians, and Hispanics/Latinas.

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<p>Causes</p>	<ul style="list-style-type: none"> • Gestational diabetes occurs when your body can't make the extra insulin needed during pregnancy. Insulin, a hormone made in your pancreas, helps your body use glucose for energy and helps control your blood glucose levels. • During pregnancy, your body makes special hormones and goes through other changes, such as weight gain. Because of these changes, your body's cells don't use insulin well, a condition called insulin resistance. All pregnant women have some insulin resistance during late pregnancy. Most pregnant women can produce enough insulin to overcome insulin resistance, but some cannot. These women develop gestational diabetes. • Being overweight or obese is linked to gestational diabetes. Women who are overweight or obese may already have insulin resistance when they become pregnant. Gaining too much weight during pregnancy may also be a factor. • Having a family history of diabetes makes it more likely that a woman will develop gestational diabetes, which suggests that genes play a role.
<p>Ways to Manage</p> <p>Also see <i>Insulin, Medicines, & Other Diabetes Treatments</i></p>	<p><i>Follow a healthy eating plan</i></p> <ul style="list-style-type: none"> • Your health care team will help you make a healthy eating plan with food choices that are good for you and your baby. The plan will help you know which foods to eat, how much to eat, and when to eat. Food choices, amounts, and timing are all important in keeping your blood glucose levels in your target range. • If you're not eating enough or your blood glucose is too high, your body might make ketones. Ketones in your urine or blood mean your body is using fat for energy instead of glucose. Burning large amounts of fat instead of glucose can be harmful to your health and your baby's health. • Your doctor might recommend you test your urine or blood daily for ketones or when your blood glucose is above a certain level, such as 200. If your ketone levels are high, your doctor may suggest that you change the type or amount of food you eat. Or, you may need to change your meal or snack times. <p><i>Be physically active</i></p> <ul style="list-style-type: none"> • Physical activity can help you reach your target blood glucose levels. If your blood pressure or cholesterol levels are too high, being physically active can help you reach healthy levels. • Physical activity can also relieve stress, strengthen your heart and bones, improve muscle strength, and keep your joints flexible. • Being physically active will also help lower your chances of having type 2 diabetes in the future. • Talk with your health care team about what activities are best for you during your pregnancy. Aim for 30 minutes of activity 5 days of the week, even if you weren't active before your pregnancy. If you are already active, tell your doctor what you do. Ask your doctor if you may continue some higher intensity activities, such as lifting weights or jogging.

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<p>Ways to Manage</p> <p>Continued</p> <p>Also see <i>Insulin, Medicines, & Other Diabetes Treatments</i></p>	<p><i>How will I know whether my blood glucose levels are on target?</i></p> <ul style="list-style-type: none">• Your health care team may ask you to use a blood glucose meter to check your blood glucose levels. This device uses a small drop of blood from your finger to measure your blood glucose level. Your health care team can show you how to use your meter. <p>Recommended daily target blood glucose levels for most women with gestational diabetes are</p> <ul style="list-style-type: none">• Before meals, at bedtime, and overnight: 95 or less• 1 hour after eating: 140 or less• 2 hours after eating: 120 or less³• Ask your doctor what targets are right for you. <p>Your health care team may ask you to use a blood glucose meter to check your blood glucose levels. You can keep track of your blood glucose levels using My Daily Blood Glucose Record (PDF, 45 KB). You can also use an electronic blood glucose tracking system on your computer or mobile device. Record the results every time you check your blood glucose. Your blood glucose records can help you and your health care team decide whether your diabetes care plan is working. Take your tracker with you when you visit your health care team.</p> <p><i>How is gestational diabetes treated if diet and physical activity aren't enough?</i></p> <ul style="list-style-type: none">• If following your eating plan and being physically active aren't enough to keep your blood glucose levels in your target range, you may need insulin.• If you need to use insulin, your health care team will show you how to give yourself insulin shots. Insulin will not harm your baby and is usually the first choice of diabetes medicine for gestational diabetes.• Researchers are studying the safety of the diabetes pills metformin and glyburide during pregnancy, but more long-term studies are needed. Talk with your health care professional about what treatment is right for you.
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Insulin, Medicines & Other Diabetes Treatments

Possible medicines for diabetes?

- Taking insulin or other diabetes medicines is often part of treating diabetes. Along with healthy food choices and physical activity, medicine can help you manage the disease. Some other treatment options are also available.
- The medicine you take will vary by your type of diabetes and how well the medicine controls your blood glucose levels, also called blood sugar.
- Other factors, such as your other health conditions, medication costs, and your daily schedule may play a role in what diabetes medicine you take.

Type 1 diabetes

- If you have type 1 diabetes, you must take insulin because your pancreas does not make it. You will need to take insulin several times during the day, including when you eat and drink, to control your blood glucose level.
- There are different ways to take insulin. You can use a needle and syringe, an insulin pen, or an insulin pump. An artificial pancreas—also called an automated insulin delivery system—may be another option for some people.

Type 2 diabetes

- Some people with type 2 diabetes can control their blood glucose level by making lifestyle changes. These lifestyle changes include consuming healthy meals and beverages, limiting calories if they have overweight or obesity, and getting physical activity.
- Many people with type 2 diabetes need to take diabetes medicines as well. These medicines may include diabetes pills or medicines you inject, such as insulin.
- Over time, you may need more than one diabetes medicine to control your blood glucose level.
- Even if you do not take insulin, you may need it at special times, such as if you are pregnant or if you are in the hospital for treatment.

Gestational diabetes

- If you have gestational diabetes, you can manage your blood glucose level by following a healthy eating plan and doing a moderate-intensity physical activity, such as brisk walking for 150 minutes, each week.
- If consuming healthy food and beverages and getting regular physical activity aren't enough to keep your blood glucose level in your target range, a doctor will work with you and may recommend you take insulin. Insulin is safe to take while you are pregnant.

No matter what type of diabetes you have, taking diabetes medicines every day can feel like a burden sometimes. New medications and improved delivery systems can help make it easier to manage your blood glucose levels. Talk with your doctor to find out which medications and delivery systems will work best for you and fit into your lifestyle.

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Different types of insulin	<p>Several types of insulin are available. Each type starts to work at a different speed, known as “onset,” and its effects last a different length of time, known as “duration.” Most types of insulin reach a peak, which is when they have the strongest effect. Then the effects of the insulin wear off over the next few hours or so.</p>			
	Types of Insulin and How They Work			
	<i>Insulin type</i>	<i>How fast it starts to work (onset)</i>	<i>When it peaks</i>	<i>How long it lasts (duration)</i>
	Rapid-acting/ ultra-rapid-acting	15 minutes	1 hour	2 to 4 hours (rapid) 5 to 7 hours (ultra)
	Rapid-acting, inhaled	10-15 minutes	30 minutes	3 hours
	Short-acting, also called regular	30 minutes	2 to 3 hours	3 to 6 hours
	Intermediate-acting	2 to 4 hours after injection	4 to 12 hours	12 to 18 hours
	Long-acting	2 hours	Does not peak	24 hours; some last longer
	Ultra long acting	6 hours	Does not peak	36 hours or longer
<p>The chart above gives averages. Follow your doctor’s advice on when and how to take your insulin. Your doctor might also recommend premixed insulin, which is a mix of two types of insulin. Some types of insulin cost more than others, so talk with your doctor about your options if you're concerned about cost.</p> <p>Source: Insulin basics. American Diabetes Association website. Accessed 2022</p>				

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Different ways to take insulin

The way you take insulin may depend on your lifestyle, insurance plan, and preferences. You may decide that needles are not for you and prefer a different method.

Needle and syringe

- You can give yourself insulin shots using a needle and syringe. You draw up your dose of insulin from the vial—or bottle—through the needle into the syringe. Insulin works fastest when you inject it in your belly, but your doctor may recommend alternating the spot where you inject it. Injecting insulin in the same spot repeatedly could cause the tissue to harden, making it harder to take shots in that area over time. Other spots you can inject insulin include your thigh, buttocks, or upper arm, but it may take longer for the insulin to work from those areas. Some people with diabetes who take insulin need 2 to 4 shots a day to reach their blood glucose targets. Others can take a single shot. Injection aids can help you give yourself the shots.

Pen

- An insulin pen looks like a writing pen but has a needle for its point. Some insulin pens come filled with insulin and are disposable. Others have room for an insulin cartridge that you insert and replace after use. Many people find insulin pens easier to use, but they cost more than needles and syringes. You may want to consider using an insulin pen if you find it hard to fill the syringe while holding the vial or cannot read the markings on the syringe.
- Different pen types have features that can help with your injections. Some reusable pens have a memory function, which can recall dose amounts and timing. Other types of “connected” insulin pens can be programmed to calculate insulin doses and provide downloadable data reports, which can help you and your doctor adjust your insulin doses.

Pump

- An insulin pump is a small machine that gives you steady doses of insulin throughout the day. You wear one type of pump outside your body on a belt or in a pocket or pouch. The insulin pump connects to a small plastic tube and a very small needle. You insert the plastic tube with a needle under your skin, then take out the needle. The plastic tube will stay inserted for several days while attached to the insulin pump. The machine pumps insulin through the tube into your body 24 hours a day and can be programmed to give you more or less insulin based on your needs. You can also give yourself doses of insulin through the pump at mealtimes.
- Another type of pump has no tubes. This pump attaches directly to your skin with a self-adhesive pad and is controlled by a hand-held device. The plastic tube and pump device are changed every several days.

Inhaler

- Another way to take insulin is by breathing powdered insulin into your mouth from an inhaler device. The insulin goes into your lungs and moves quickly into your blood. You may want to use an insulin inhaler [NIH external link](#) to avoid using needles. Inhaled insulin is only for adults with type 1 or type 2 diabetes. Taking insulin with an inhaler is less common than using a needle and syringe.

Artificial pancreas

- An artificial pancreas is a system of three devices that work together to mimic how a healthy pancreas controls blood glucose in the body.
- A continuous glucose monitor (CGM) tracks blood glucose levels every few minutes using a small sensor inserted under the skin that is held in place with an adhesive pad.
- The CGM wirelessly sends the information to a program on a smartphone or an insulin infusion pump. The program calculates how much insulin you need.
- The insulin infusion pump will adjust how much insulin is given from minute to minute to help keep your blood glucose level in your target range.
- An artificial pancreas is mainly used to help people with type 1 diabetes.

Jet injector

- This device sends a fine spray of insulin into the skin at high pressure instead of using a needle to deliver the insulin.

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<p>Oral and Injectable medicines treat type 2 diabetes</p>	<ul style="list-style-type: none"> • You may need medicines along with healthy eating and physical activity habits to manage your type 2 diabetes. You can take many diabetes medicines by mouth. These medicines are called oral medicines. • Most people with type 2 diabetes start medical treatment with metformin pills. Metformin also comes as a liquid. Metformin lowers the amount of glucose that your liver makes and helps your body use insulin better. This drug may help you lose a small amount of weight. • Other oral medicines act in different ways to lower blood glucose levels. You may need to add another diabetes medicine after a while or use a combination treatment. Combining two or three kinds of diabetes medicines can lower blood glucose levels more than taking just one. <p><i>Injectable medicines</i></p> <ul style="list-style-type: none"> • Besides insulin, other types of injected medicines are available. These medicines help keep your blood glucose level from going too high after you eat. They may make you feel less hungry and help you lose some weight. Other injectable medicines are not substitutes for insulin.
<p>Side effects of diabetes medicines</p>	<p>Side effects are problems that result from a medicine. Some diabetes medicines can cause hypoglycemia, also called low blood glucose, if you don't balance your medicines with food and activity.</p> <p>Ask your doctor whether your diabetes medicine can cause hypoglycemia or other side effects, such as upset stomach and weight gain. Take your diabetes medicines as your health care professional has instructed you, to help prevent side effects and diabetes problems.</p>
<p>Other treatment options</p>	<p><i>Bariatric surgery</i></p> <ul style="list-style-type: none"> • Also called weight-loss surgery or metabolic surgery, bariatric surgery may help some people with obesity and type 2 diabetes lose a large amount of weight and regain normal blood glucose levels. Some people with diabetes may no longer need their diabetes medicine after bariatric surgery. • Whether and for how long blood glucose levels improve seems to vary by the patient, type of weight-loss surgery, and amount of weight the person loses. Other factors include how long someone has had diabetes and whether or not the person uses insulin. <p><i>Artificial Pancreas</i></p> <ul style="list-style-type: none"> • The NIDDK has played an important role in developing “artificial pancreas” technology. An artificial pancreas replaces manual blood glucose testing and the use of insulin shots or a pump. A single system monitors blood glucose levels around the clock and provides insulin or a combination of insulin and a second hormone, glucagon, automatically. The system can also be monitored remotely, for example by parents or medical staff. • In 2016, the FDA approved a type of artificial pancreas system called a hybrid closed-loop system. This system tests your glucose level every 5 minutes throughout the day and night, and automatically gives you the right amount of insulin. • You still need to manually adjust the amount of insulin the pump delivers at mealtimes. But, the artificial pancreas may free you from some of the daily tasks needed to keep your blood glucose stable—or help you sleep through the night without the need to wake and test your glucose or take medicine. • The hybrid closed-loop system is expected to be available in the U.S. in 2017. Talk with your health care provider about whether this system might be right for you.

Diabetic Neuropathy

<p>Also see Peripheral Neuropathy</p>	<p>Diabetic neuropathy is nerve damage that is caused by diabetes. Nerves are bundles of special tissues that carry signals between your brain and other parts of your body. The signals:</p> <ul style="list-style-type: none"> • Send information about how things feel • Move your body parts • Control body functions such as digestion <p>Types of diabetic neuropathy include the following:</p> <p><i>Peripheral neuropathy</i></p> <ul style="list-style-type: none"> • Peripheral neuropathy is nerve damage that typically affects the feet and legs and sometimes affects the hands and arms. <p><i>Autonomic neuropathy</i></p> <ul style="list-style-type: none"> • Autonomic neuropathy is damage to nerves that control your internal organs. Autonomic neuropathy can lead to problems with your heart rate and blood pressure, digestive system, bladder, sex organs, sweat glands, eyes, and ability to sense hypoglycemia. <p><i>Focal neuropathies</i></p> <ul style="list-style-type: none"> • Focal neuropathies are conditions in which you typically have damage to single nerves, most often in your hand, head, torso, and leg. <p><i>Proximal neuropathy</i></p> <ul style="list-style-type: none"> • Proximal neuropathy is a rare and disabling type of nerve damage in your hip, buttock, or thigh. This type of nerve damage typically affects one side of your body and may rarely spread to the other side. Proximal neuropathy often causes severe pain and may lead to significant weight loss.
<p>Who is most likely to get diabetic neuropathy?</p>	<p>If you have diabetes, your chance of developing nerve damage caused by diabetes increases the older you get and the longer you have diabetes. Managing your diabetes is an important part of preventing health problems such as diabetic neuropathy. You are also more likely to develop nerve damage if you have diabetes and</p> <ul style="list-style-type: none"> • Are overweight • Have high blood pressure • Have high cholesterol • Have advanced kidney disease • Drink too many alcoholic drinks • Smoke • Research also suggests that certain genes may make people more likely to develop diabetic neuropathy.
<p>Causes</p>	<ul style="list-style-type: none"> • Over time, high blood glucose levels, also called blood sugar, and high levels of fats, such as triglycerides, in the blood from diabetes can damage your nerves. • High blood glucose levels can also damage the small blood vessels that nourish your nerves with oxygen and nutrients. • Without enough oxygen and nutrients, your nerves cannot function well.

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<p>How common is diabetic neuropathy?</p>	<ul style="list-style-type: none"> • Although different types of diabetic neuropathy can affect people who have diabetes, research suggests that up to one-half of people with diabetes have peripheral neuropathy. More than 30 percent of people with diabetes have autonomic neuropathy. • The most common type of focal neuropathy is carpal tunnel syndrome, in which a nerve in your wrist is compressed. Although less than 10 percent of people with diabetes feel symptoms of carpal tunnel syndrome, about 25 percent of people with diabetes have some nerve compression at the wrist.
<p>Symptoms</p>	<ul style="list-style-type: none"> • Your symptoms depend on which type of diabetic neuropathy you have. • In peripheral neuropathy, some people may have a loss of sensation in their feet, while others may have burning or shooting pain in their lower legs. • Most nerve damage develops over many years, and some people may not notice symptoms of mild nerve damage for a long time. • In some people, severe pain begins suddenly.
<p>What problems does diabetic neuropathy cause?</p>	<ul style="list-style-type: none"> • Peripheral neuropathy can lead to foot complications, such as sores, ulcers, and infections, because nerve damage can make you lose feeling in your feet. As a result, you may not notice that your shoes are causing a sore or that you have injured your feet. Nerve damage can also cause problems with balance and coordination, leading to falls and fractures. <i>(See Diabetes and Foot Problems)</i> • These problems may make it difficult for you to get around easily, causing you to lose some of your independence. In some people with diabetes, nerve damage causes chronic pain, which can lead to anxiety and depression . • Autonomic neuropathy can cause problems with how your organs work, including problems with your heart rate and blood pressure, digestion, urination, and ability to sense when you have low blood glucose.
<p>Prevention</p>	<p>To prevent diabetic neuropathy, it is important to manage your diabetes by managing your blood glucose, blood pressure, and cholesterol levels.</p> <p>You should also take the following steps to help prevent diabetes-related nerve damage:</p> <ul style="list-style-type: none"> • Be physically active • Follow your diabetes meal plan • Get help to quit smoking • Limit alcoholic drinks to no more than one drink per day for women and no more than two drinks per day for men • Take any diabetes medicines and other medicines your doctor prescribes
<p>How can I prevent diabetic neuropathy from getting worse?</p>	<ul style="list-style-type: none"> • If you have diabetic neuropathy, you should manage your diabetes, which means managing your blood glucose, blood pressure, cholesterol levels, and weight to keep nerve damage from getting worse. • Foot care is very important for all people with diabetes, and it's even more important if you have peripheral neuropathy. Check your feet for problems every day, and take good care of your feet. See your doctor for a neurological exam and a foot exam at least once a year—more often if you have foot problems. <i>(See Diabetes and Foot Problems)</i>

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Peripheral Neuropathy

Peripheral neuropathy is a type of nerve damage that typically affects the feet and legs and sometimes affects the hands and arms. This type of neuropathy is very common. Up to one-half of people with diabetes have peripheral neuropathy.

Causes

Over time, high blood glucose, also called blood sugar, and high levels of fats, such as triglycerides, in the blood from diabetes can damage your nerves and the small blood vessels that nourish your nerves, leading to peripheral neuropathy.

Symptoms

If you have peripheral neuropathy, your feet, legs, hands, or arms may feel:

- Burning
- Tingling, like “pins and needles”
- Numb
- Painful
- Weak
- You may feel extreme pain in your feet, legs, hands, and arms, even when they are touched lightly. You may also have problems sensing pain or temperature in these parts of your body.

Symptoms are often worse at night. Most of the time, you will have symptoms on both sides of your body. However, you may have symptoms only on one side.

If you have peripheral neuropathy, you might experience:

- Changes in the way you walk
- Loss of balance, which could make you fall more often
- Loss of muscle tone in your hands and feet
- Pain when you walk
- Problems sensing movement or position
- Swollen feet

What problems does peripheral neuropathy cause?

- Peripheral neuropathy can cause foot problems that lead to blisters and sores. If peripheral neuropathy causes you to lose feeling in your feet, you may not notice pressure or injuries that lead to blisters and sores. Diabetes can make these wounds difficult to heal and increase the chance of infections. These sores and infections can lead to the loss of a toe, foot, or part of your leg. Finding and treating foot problems early can lower the chances that you will develop serious infections.
- This type of diabetes-related nerve damage can also cause changes to the shape of your feet and toes. A rare condition that can occur in some people with diabetes is Charcot’s foot, a problem in which the bones and tissue in your foot are damaged.
- Peripheral neuropathy can make you more likely to lose your balance and fall, which can increase your chance of fractures and other injuries. The chronic pain of peripheral neuropathy can also lead to grief, anxiety, and depression.

How can I prevent the problems caused by peripheral neuropathy?

- You can prevent the problems caused by peripheral neuropathy by managing your diabetes, which means managing your blood glucose, blood pressure, and cholesterol. Staying close to your goal numbers can keep nerve damage from getting worse.
- If you have diabetes, check your feet for problems every day and take good care of your feet. If you notice any foot problems, call or see your doctor right away.
- Remove your socks and shoes in the exam room to remind your doctor to check your feet at every office visit. See your doctor for a foot exam at least once a year—more often if you have foot problems. Your doctor may send you to a podiatrist.

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<p>How do doctors treat peripheral neuropathy?</p>	<p>Doctors may prescribe medicine and other treatments for pain.</p> <p><i>Medicines for nerve pain</i></p> <p>Your doctor may prescribe medicines to help with pain, such as certain types of</p> <ul style="list-style-type: none">• Antidepressants, including<ul style="list-style-type: none">○ Tricyclic antidepressants, such as nortriptyline , desipramine , imipramine , and amitriptyline○ Other types of antidepressants, such as duloxetine , venlafaxine , paroxetine , and citalopram• Anticonvulsants—medicines designed to treat seizures—such as gabapentin and pregabalin• Skin creams, patches, or sprays, such as lidocaine <p>Although these medicines can help with the pain, they do not change the nerve damage. Therefore, if there is no improvement with a medicine to treat pain, there is no benefit to continuing to take it and another medication may be tried.</p> <ul style="list-style-type: none">• All medicines have side effects. Ask your doctor about the side effects of any medicines you take. Doctors don't recommend some medicines for older adults or for people with other health problems, such as heart disease.• Some doctors recommend avoiding over-the-counter pain medicines , such as acetaminophen and ibuprofen. These medicines may not work well for treating most nerve pain and can have side effects. <p><i>Other treatments for nerve pain</i></p> <p>Your doctor may recommend other treatments for pain, including</p> <ul style="list-style-type: none">• Physical therapy to improve your strength and balance• A bed cradle, a device that keeps sheets and blankets off your legs and feet while you sleep• Diabetes experts have not made special recommendations about supplements for people with diabetes. For safety reasons, talk with your doctor before using supplements or any complementary or alternative medicines or medical practices.
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Diabetes and Foot Problems

Foot problems are common in people with diabetes. You might be afraid you'll lose a toe, foot, or leg to diabetes, or know someone who has, but you can lower your chances of having diabetes-related foot problems by taking care of your feet every day. Managing your blood glucose levels, also called blood sugar, can also help keep your feet healthy.

How can diabetes affect my feet?

- Over time, diabetes may cause nerve damage, also called diabetic neuropathy, that can cause tingling and pain, and can make you lose feeling in your feet. When you lose feeling in your feet, you may not feel a pebble inside your sock or a blister on your foot, which can lead to cuts and sores. Cuts and sores can become infected.
- Diabetes also can lower the amount of blood flow in your feet. Not having enough blood flowing to your legs and feet can make it hard for a sore or an infection to heal. Sometimes, a bad infection never heals. The infection might lead to gangrene.
- Gangrene and foot ulcers that do not get better with treatment can lead to an amputation of your toe, foot, or part of your leg. A surgeon may perform an amputation to prevent a bad infection from spreading to the rest of your body, and to save your life. Good foot care is very important to prevent serious infections and gangrene.
- Although rare, nerve damage from diabetes can lead to changes in the shape of your feet, such as Charcot's foot. Charcot's foot may start with redness, warmth, and swelling. Later, bones in your feet and toes can shift or break, which can cause your feet to have an odd shape, such as a "rocker bottom."

What can I do to keep my feet healthy?

Work with your health care team to make a diabetes self-care plan, which is an action plan for how you will manage your diabetes. Your plan should include foot care. A foot doctor, also called a podiatrist, and other specialists may be part of your health care team.

Include these steps in your foot care plan:

- Check your feet every day.
- Wash your feet every day.
- Smooth corns and calluses gently.
- Trim your toenails straight across.
- Wear shoes and socks at all times.
- Protect your feet from hot and cold.
- Keep the blood flowing to your feet.
- Get a foot check at every health care visit.

Wash your feet every day

- Wash your feet with soap in warm, not hot, water. Test the water to make sure it is not too hot. You can use a thermometer (90° to 95° F is safe) or your elbow to test the warmth of the water. Do not soak your feet because your skin will get too dry.
- After washing and drying your feet, put talcum powder or cornstarch between your toes. Skin between the toes tends to stay moist. Powder will keep the skin dry to help prevent an infection.

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What can I do to keep my feet healthy?

Continued

Check your feet every day

You may have foot problems, but feel no pain in your feet. Checking your feet each day will help you spot problems early before they get worse. A good way to remember is to check your feet each evening when you take off your shoes. Also check between your toes. If you have trouble bending over to see your feet, try using a mirror to see them, or ask someone else to look at your feet.

Look for problems such as:

- Cuts, sores, or red spots
- Swelling or fluid-filled blisters
- Ingrown toenails, in which the edge of your nail grows into your skin
- Corns or calluses, which are spots of rough skin caused by too much rubbing or pressure on the same spot
- Plantar warts, which are flesh-colored growths on the bottom of the feet
- Athlete's foot
- Warm spots

If you have certain foot problems that make it more likely you will develop a sore on your foot, your doctor may recommend taking the temperature of the skin on different parts of your feet. A "hot spot" can be the first sign that a blister or an ulcer is starting.

Cover a blister, cut, or sore with a bandage. Smooth corns and calluses as explained below.

Smooth corns and calluses gently

Thick patches of skin called corns or calluses can grow on the feet. If you have corns or calluses, talk with your foot doctor about the best way to care for these foot problems. If you have nerve damage, these patches can become ulcers.

If your doctor tells you to, use a pumice stone to smooth corns and calluses after bathing or showering. A pumice stone is a type of rock used to smooth the skin. Rub gently, only in one direction, to avoid tearing the skin.

Do NOT:

- Cut corns and calluses
- Use corn plasters, which are medicated pads
- Use liquid corn and callus removers

Cutting and over-the-counter corn removal products can damage your skin and cause an infection. To keep your skin smooth and soft, rub a thin coat of lotion, cream, or petroleum jelly on the tops and bottoms of your feet. Do not put lotion or cream between your toes because moistness might cause an infection.

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What can I do to keep my feet healthy?

Continued

Trim your toenails straight across

Trim your toenails, when needed, after you wash and dry your feet. Using toenail clippers, trim your toenails straight across. Do not cut into the corners of your toenail. Gently smooth each nail with an emery board or non-sharp nail file. Trimming this way helps prevent cutting your skin and keeps the nails from growing into your skin.

Have a foot doctor trim your toenails if

- You cannot see, feel, or reach your feet
- Your toenails are thick or yellowed
- Your nails curve and grow into the skin

If you want to get a pedicure at a salon, you should bring your own nail tools to prevent getting an infection. You can ask your health care provider what other steps you can take to prevent infection.

Wear shoes and socks at all times.

- Do not walk barefoot or in just socks – even when you are indoors. You could step on something and hurt your feet. You may not feel any pain and may not know that you hurt yourself.
- Check the inside of your shoes before putting them on, to make sure the lining is smooth and free of pebbles or other objects.
- Make sure you wear socks, stockings, or nylons with your shoes to keep from getting blisters and sores. Choose clean, lightly padded socks that fit well. Socks with no seams are best.

Wear shoes that fit well and protect your feet. Here are some tips for finding the right type of shoes:

- Walking shoes and athletic shoes are good for daily wear. They support your feet and allow them to “breathe.”
- Do not wear vinyl or plastic shoes, because they do not stretch or “breathe.”
- When buying shoes, make sure they feel good and have enough room for your toes. Buy shoes at the end of the day, when your feet are the largest, so that you can find the best fit.
- If you have a bunion, or hammertoes, which are toes that curl under your feet, you may need extra-wide or deep shoes. Do not wear shoes with pointed toes or high heels, because they put too much pressure on your toes.
- If your feet have changed shape, such as from Charcot’s foot, you may need special shoes or shoe inserts, called orthotics. You also may need inserts if you have bunions, hammertoes, or other foot problems.
- When breaking in new shoes, only wear them for a few hours at first and then check your feet for areas of soreness.

Medicare Part B insurance and other health insurance programs may help pay for these special shoes or inserts. Ask your insurance plan if it covers your special shoes or inserts.

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What can I do to keep my feet healthy?

Continued

Protect your feet from hot and cold

If you have nerve damage from diabetes, you may burn your feet and not know you did.

Take the following steps to protect your feet from heat:

- Wear shoes at the beach and on hot pavement.
- Put sunscreen on the tops of your feet to prevent sunburn.
- Keep your feet away from heaters and open fires.
- Do not put a hot water bottle or heating pad on your feet.
- Wear socks in bed if your feet get cold. In the winter, wear lined, waterproof boots to keep your feet warm and dry.

Keep the blood flowing to your feet

Try the following tips to improve blood flow to your feet:

- Put your feet up when you are sitting.
- Wiggle your toes for a few minutes throughout the day. Move your ankles up and down and in and out to help blood flow in your feet and legs.
- Do not wear tight socks or elastic stockings. Do not try to hold up loose socks with rubber bands.
- Be more physically active. Choose activities that are easy on your feet, such as walking, dancing, yoga or stretching, swimming, or bike riding.
- Stop smoking.

Get a foot check at every health care visit

Ask your health care team to check your feet at each visit. Take off your shoes and socks when you're in the exam room so they will remember to check your feet. At least once a year, get a thorough foot exam, including a check of the feeling and pulses in your feet.

Get a thorough foot exam at each health care visit if you have:

- Changes in the shape of your feet
- Loss of feeling in your feet
- Peripheral artery disease
- Had foot ulcers or an amputation in the past

Ask your health care team to show you how to care for your feet.

When should I see my health care provider about foot problems?

Call your health care provider right away if you have:

- A cut, blister, or bruise on your foot that does not start to heal after a few days
- Skin on your foot that becomes red, warm, or painful—signs of a possible infection
- A callus with dried blood inside of it, which often can be the first sign of a wound under the callus
- A foot infection that becomes black and smelly—signs you might have gangrene

Ask your provider to refer you to a foot doctor, or podiatrist, if needed.

Hypoglycemia

Hypoglycemia, also called low blood glucose or low blood sugar, occurs when the level of glucose in your blood drops below normal. For many people with diabetes, that means a level of 70 milligrams per deciliter (mg/dL) or less. Your numbers might be different, so check with your health care provider to find out what level is too low for you.

Symptoms

- Symptoms of hypoglycemia tend to come on quickly and can vary from person to person. You may have one or more mild-to-moderate symptoms listed in the table below. Sometimes people don't feel any symptoms.
- Severe hypoglycemia is when your blood glucose level becomes so low that you're unable to treat yourself and need help from another person. Severe hypoglycemia is dangerous and needs to be treated right away. This condition is more common in people with type 1 diabetes.

Hypoglycemia Symptoms

Mild-to-Moderate		Severe
<ul style="list-style-type: none"> • Shaky or jittery • Sweaty • Hungry • Headachy • Blurred vision • Sleepy or tired • Dizzy or lightheaded • Confused or disoriented • Pale 	<ul style="list-style-type: none"> • Uncoordinated • Irritable or nervous • Argumentative or combative • Changed behavior or personality • Trouble concentrating • Weak • Fast or irregular heart beat 	<ul style="list-style-type: none"> • Unable to eat or drink • Seizures or convulsions (jerky movements) • Unconsciousness

Some symptoms of hypoglycemia during sleep are:

- Crying out or having nightmares
- Sweating enough to make your pajamas or sheets damp
- Feeling tired, irritable, or confused after waking up

Causes

- Hypoglycemia can be a side effect of insulin or other types of diabetes medicines that help your body make more insulin.
- Two types of diabetes pills can cause hypoglycemia: sulfonylureas and meglitinides. Ask your health care team if your diabetes medicine can cause hypoglycemia.
- Although other diabetes medicines don't cause hypoglycemia by themselves, they can increase the chances of hypoglycemia if you also take insulin, a sulfonylurea, or a meglitinide.

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<p>What other factors contribute to hypoglycemia in diabetes?</p>	<p>If you take insulin or diabetes medicines that increase the amount of insulin your body makes—but don't match your medications with your food or physical activity—you could develop hypoglycemia. The following factors can make hypoglycemia more likely:</p> <ul style="list-style-type: none"> • Not eating enough carbohydrates (carbs): When you eat foods containing carbohydrates, your digestive system breaks down the sugars and starches into glucose. Glucose then enters your bloodstream and raises your blood glucose level. If you don't eat enough carbohydrates to match your medication, your blood glucose could drop too low. • Skipping or delaying a meal. If you skip or delay a meal, your blood glucose could drop too low. Hypoglycemia also can occur when you are asleep and haven't eaten for several hours. • Increasing physical activity. Increasing your physical activity level beyond your normal routine can lower your blood glucose level for up to 24 hours after the activity. • Drinking too much alcohol without enough food • Alcohol makes it harder for your body to keep your blood glucose level steady, especially if you haven't eaten in a while. The effects of alcohol can also keep you from feeling the symptoms of hypoglycemia, which may lead to severe hypoglycemia. • Being sick. When you're sick, you may not be able to eat as much or keep food down, which can cause low blood glucose.
<p>Prevention</p>	<p>If you are taking insulin, a sulfonylurea, or a meglitinide, using your diabetes management plan and working with your health care team to adjust your plan as needed can help you prevent hypoglycemia. The following actions can also help prevent hypoglycemia:</p> <p><i>Check blood glucose levels</i></p> <p>Knowing your blood glucose level can help you decide how much medicine to take, what food to eat, and how physically active to be. To find out your blood glucose level, check yourself with a blood glucose meter as often as your doctor advises.</p> <ul style="list-style-type: none"> • <i>Hypoglycemia unawareness.</i> Sometimes people with diabetes don't feel or recognize the symptoms of hypoglycemia, a problem called hypoglycemia unawareness. If you have had hypoglycemia without feeling any symptoms, you may need to check your blood glucose more often so you know when you need to treat your hypoglycemia or take steps to prevent it. Be sure to check your blood glucose before you drive. • If you have hypoglycemia unawareness or have hypoglycemia often, ask your health care provider about a continuous glucose monitor (CGM). A CGM checks your blood glucose level at regular times throughout the day and night. CGMs can tell you if your blood glucose is falling quickly and sound an alarm if your blood glucose falls too low. CGM alarms can wake you up if you have hypoglycemia during sleep. <p><i>Eat regular meals and snacks</i></p> <ul style="list-style-type: none"> • Your meal plan is key to preventing hypoglycemia. Eat regular meals and snacks with the correct amount of carbohydrates to help keep your blood glucose level from going too low. Also, if you drink alcoholic beverages, it's best to eat some food at the same time. <p><i>Be physically active safely</i></p> <ul style="list-style-type: none"> • Physical activity can lower your blood glucose during the activity and for hours afterward. To help prevent hypoglycemia, you may need to check your blood glucose before, during, and after physical activity and adjust your medicine or carbohydrate intake. For example, you might eat a snack before being physically active or decrease your insulin dose as directed by your health care provider to keep your blood glucose from dropping too low. • Tell your health care team if you have had hypoglycemia. Your health care team may adjust your diabetes medicines or other aspects of your management plan. Learn about balancing your medicines, eating plan, and physical activity to prevent hypoglycemia. • Ask if you should have a glucagon emergency kit to carry with you at all times.

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How do I treat hypoglycemia	<ul style="list-style-type: none">• If you begin to feel one or more hypoglycemia symptoms, check your blood glucose. If your blood glucose level is below your target or less than 70, eat or drink 15 grams of carbohydrates right away. Examples include:<ul style="list-style-type: none">○ Four glucose tablets or one tube of glucose gel○ 1/2 cup (4 ounces) of fruit juice—not low-calorie or reduced sugar*○ 1/2 can (4 to 6 ounces) of soda—not low-calorie or reduced sugar○ 1 tablespoon of sugar, honey, or corn syrup○ 2 tablespoons of raisins• Wait 15 minutes and check your blood glucose again. If your glucose level is still low, eat or drink another 15 grams of glucose or carbohydrates. Check your blood glucose again after another 15 minutes. Repeat these steps until your glucose level is back to normal.• If your next meal is more than 1 hour away, have a snack to keep your blood glucose level in your target range. Try crackers or a piece of fruit. <p><i>People who have kidney disease shouldn't drink orange juice for their 15 grams of carbohydrates because it contains a lot of potassium. Apple, grape, or cranberry juice are good options.</i></p> <p><i>Treating hypoglycemia if you take acarbose or miglitol</i></p> <ul style="list-style-type: none">• If you take acarbose or miglitol along with diabetes medicines that can cause hypoglycemia, you will need to take glucose tablets or glucose gel if your blood glucose level is too low.• Eating or drinking other sources of carbohydrates won't raise your blood glucose level quickly enough.
What if I have severe hypoglycemia and can't treat myself?	<ul style="list-style-type: none">• Someone will need to give you a glucagon injection if you have severe hypoglycemia. An injection of glucagon will quickly raise your blood glucose level. Talk with your health care provider about when and how to use a glucagon emergency kit. If you have an emergency kit, check the date on the package to make sure it hasn't expired.• If you are likely to have severe hypoglycemia, teach your family, friends, and coworkers when and how to give you a glucagon injection. Also, tell your family, friends, and coworkers to call 911 right away after giving you a glucagon injection or if you don't have a glucagon emergency kit with you.• If you have hypoglycemia often or have had severe hypoglycemia, you should wear a medical alert bracelet or pendant. A medical alert ID tells other people that you have diabetes and need care right away. Getting prompt care can help prevent the serious problems that hypoglycemia can cause.

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Physical Activity

Physical activity	<ul style="list-style-type: none">• Lowers blood glucose levels• Lowers blood pressure• Improves blood flow• Burns extra calories so you can keep your weight down if needed• Improves your mood• Can prevent falls and improve memory in older adults• May help you sleep better <p>If you are overweight, combining physical activity with a reduced-calorie eating plan can lead to even more benefits. In the Look AHEAD: Action for Health in Diabetes study, overweight adults with type 2 diabetes who ate less and moved more had greater long-term health benefits compared to those who didn't make these changes. These benefits included improved cholesterol levels, less sleep apnea, and being able to move around more easily.</p> <p>Even small amounts of physical activity can help. Experts suggest that you aim for at least 30 minutes of moderate or vigorous physical activity 5 days of the week. Moderate activity feels somewhat hard, and vigorous activity is intense and feels hard. If you want to lose weight or maintain weight loss, you may need to do 60 minutes or more of physical activity 5 days of the week.</p> <p>Be patient. It may take a few weeks of physical activity before you see changes in your health.</p>
How can I be physically active safely if I have diabetes?	<p>Be sure to drink water before, during, and after exercise to stay well hydrated. The following are some other tips for safe physical activity when you have diabetes.</p> <p>Plan ahead</p> <ul style="list-style-type: none">• Talk with your health care team before you start a new physical activity routine, especially if you have other health problems. Your health care team will tell you a target range for your blood glucose level and suggest how you can be active safely.• Your health care team also can help you decide the best time of day for you to do physical activity based on your daily schedule, meal plan, and diabetes medicines. If you take insulin, you need to balance the activity that you do with your insulin doses and meals so you don't get low blood glucose. <p>Prevent low blood glucose</p> <ul style="list-style-type: none">• Because physical activity lowers your blood glucose, you should protect yourself against low blood glucose levels, also called hypoglycemia. You are most likely to have hypoglycemia if you take insulin or certain other diabetes medicines, such as a sulfonylurea. Hypoglycemia also can occur after a long intense workout or if you have skipped a meal before being active. Hypoglycemia can happen during or up to 24 hours after physical activity.• Planning is key to preventing hypoglycemia. For instance, if you take insulin, your health care provider might suggest you take less insulin or eat a small snack with carbohydrates before, during, or after physical activity, especially intense activity.• You may need to check your blood glucose level before, during, and right after you are physically active.

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<p>How can I be physically active safely if I have diabetes?</p> <p><i>Continued</i></p>	<p>Stay safe when blood glucose is high - Type 1 Diabetes</p> <ul style="list-style-type: none">• If you have <i>type 1</i> diabetes, avoid vigorous physical activity when you have ketones in your blood or urine. Ketones are chemicals your body might make when your blood glucose level is too high, a condition called hyperglycemia, and your insulin level is too low.• If you are physically active when you have ketones in your blood or urine, your blood glucose level may go even higher. Ask your health care team what level of ketones are dangerous for you and how to test for them.• Ketones are uncommon in people with type 2 diabetes. <p>Take care of your feet</p> <ul style="list-style-type: none">• People with diabetes may have problems with their feet because of poor blood flow and nerve damage that can result from high blood glucose levels.• To help prevent foot problems, you should wear comfortable, supportive shoes and take care of your feet before, during, and after physical activity.
<p>What physical activities should I do?</p>	<ul style="list-style-type: none">• Most kinds of physical activity can help you take care of your diabetes. Certain activities may be unsafe for some people, such as those with low vision or nerve damage to their feet.• Ask your health care team what physical activities are safe for you. Many people choose walking with friends or family members for their activity.• Doing different types of physical activity each week will give you the most health benefits. Mixing it up also helps reduce boredom and lower your chance of getting hurt. <p>Try these options for physical activity.</p> <p>Add extra activity to your daily routine</p> <p>If you have been inactive or you are trying a new activity, start slowly, with 5 to 10 minutes a day. Then add a little more time each week. Increase daily activity by spending less time in front of a TV or other screen. Try these simple ways to add physical activities in your life each day:</p> <ul style="list-style-type: none">• Walk around while you talk on the phone or during TV commercials.• Do chores, such as work in the garden, rake leaves, clean the house, or wash the car.• Park at the far end of the shopping center parking lot and walk to the store.• Take the stairs instead of the elevator.• Make your family outings active, such as a family bike ride or a walk in a park. <p>If you are sitting for a long time, such as working at a desk or watching TV, do some light activity for 3 minutes or more every half hour. Light activities include:</p> <ul style="list-style-type: none">• Leg lifts or extensions• Overhead arm stretches• Desk chair swivels• Torso twists• Side lunges• Walking in place

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What physical activities should I do?

Continued

Do aerobic exercise

Aerobic exercise is activity that makes your heart beat faster and makes you breathe harder. You should aim for doing aerobic exercise for 30 minutes a day most days of the week. You do not have to do all the activity at one time. You can split up these minutes into a few times throughout the day.

To get the most out of your activity, exercise at a moderate to vigorous level. Try:

- Walking briskly or hiking
- Climbing stairs
- Swimming or a water-aerobics class
- Dancing
- Riding a bicycle or a stationary bicycle
- Taking an exercise class
- playing basketball, tennis, or other sports

Talk with your health care team about how to warm up and cool down before and after you exercise.

Do strength training to build muscle

- Strength training is a light or moderate physical activity that builds muscle and helps keep your bones healthy. Strength training is important for both men and women. When you have more muscle and less body fat, you'll burn more calories. Burning more calories can help you lose and keep off extra weight.
- You can do strength training with hand weights, elastic bands, or weight machines. Try to do strength training two to three times a week. Start with a light weight. Slowly increase the size of your weights as your muscles become stronger.

Do stretching exercises

- Stretching exercises are light or moderate physical activity. When you stretch, you increase your flexibility, lower your stress, and help prevent sore muscles.
- You can choose from many types of stretching exercises. Yoga is a type of stretching that focuses on your breathing and helps you relax. Even if you have problems moving or balancing, certain types of yoga can help. For instance, chair yoga has stretches you can do when sitting in a chair or holding onto a chair while standing. Your health care team can suggest whether yoga is right for you.

Refer to the following sections for more information about exercises:

- Warm up/Cool Down
- Flexibility/Stretching
- Core/Abdominal
- Balance
- Strengthening
- Lower Extremity Strengthening in lying or seated
- Upper Extremity Strengthening
- Agility
- Aerobic / Endurance

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<p>Special Considerations for People with Diabetes</p> <p>CDC</p>	<p>One of the “side effects” of pancreatic cancer/surgery is diabetes. It is important to understand the correlation between blood sugar and exercise.</p> <p>Before starting any physical activity, check with your health care provider to talk about the best physical activities for you. Be sure to discuss which activities you like, how to prepare, and what you should avoid.</p> <ul style="list-style-type: none">• Drink plenty of fluids while being physically active to prevent dehydration (harmful loss of water in the body).• Make sure to check your blood sugar before being physically active, especially if you take insulin.• If it's below 100 mg/dL, you may need to eat a small snack containing 15-30 grams of carbohydrates, such as 2 tablespoons of raisins or ½ cup of fruit juice or regular soda (not diet), or glucose tablets so your blood sugar doesn't fall too low while being physically active. Low blood sugar (hypoglycemia) can be very serious.• If it's above 240 mg/dL, your blood sugar may be too high (hyperglycemia) to be active safely. Test your urine for ketones – substances made when your body breaks down fat for energy. The presence of ketones indicates that your body doesn't have enough insulin to control your blood sugar. If you are physically active when you have high ketone levels, you risk ketoacidosis – a serious diabetes complication that needs immediate treatment.• When you're physically active, wear cotton socks and athletic shoes that fit well and are comfortable.• After your activity, check to see how it has affected your blood glucose level.• After being physically active, check your feet for sores, blisters, irritation, cuts, or other injuries.• <i>Call your health care provider if an injury doesn't begin to heal after 2 days.</i> <p><i>CDC – Diabetes – Get Active</i></p>
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Diet

What foods can I eat?	<p>You may worry that having diabetes means going without foods you enjoy. The good news is that you can still eat your favorite foods, but you might need to eat smaller portions or enjoy them less often. Your health care team will help create a diabetes meal plan for you that meets your needs and likes.</p> <p>The key to eating with diabetes is to eat a variety of healthy foods from all food groups, in the amounts your meal plan outlines.</p> <p>The food groups are</p> <ul style="list-style-type: none">• Vegetables<ul style="list-style-type: none">○ Non-starchy: includes broccoli, carrots, greens, peppers, and tomatoes○ Starchy: includes potatoes, corn, and green peas• Fruits—includes oranges, melon, berries, apples, bananas, and grapes• Grains—at least half of your grains for the day should be whole grains<ul style="list-style-type: none">○ Includes wheat, rice, oats, cornmeal, barley, and quinoa○ Examples: bread, pasta, cereal, and tortillas• Protein<ul style="list-style-type: none">○ Lean meat○ chicken or turkey without the skin○ Fish○ Eggs○ Nuts and peanuts○ Dried beans and certain peas, such as chickpeas and split peas○ Meat substitutes, such as tofu• Dairy—nonfat or low fat<ul style="list-style-type: none">○ Milk or lactose-free milk if you have lactose intolerance○ Yogurt○ Cheese <p>Learn more about the food groups at the U.S. Department of Agriculture’s (USDA) ChooseMyPlate.gov.</p> <p>Eat foods with heart-healthy fats, which mainly come from these foods:</p> <ul style="list-style-type: none">• Oils that are liquid at room temperature, such as canola and olive oil• Nuts and seeds• Heart-healthy fish such as salmon, tuna, and mackerel• Avocado <p>Use oils when cooking food instead of butter, cream, shortening, lard, or stick margarine.</p>
What foods and drinks should I limit?	<p>Foods and drinks to limit include</p> <ul style="list-style-type: none">• Fried foods and other foods high in saturated fat and trans fat• Foods high in salt, also called sodium• Sweets, such as baked goods, candy, and ice cream• Beverages with added sugars, such as juice, regular soda, and regular sports or energy drinks• Drink water instead of sweetened beverages. Consider using a sugar substitute in your coffee or tea. <p>If you drink alcohol, drink moderately—no more than one drink a day if you’re a woman or two drinks a day if you’re a man. If you use insulin or diabetes medicines that increase the amount of insulin your body makes, alcohol can make your blood glucose level drop too low. This is especially true if you haven’t eaten in a while. It’s best to eat some food when you drink alcohol.</p>

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<p>When should I eat?</p>	<ul style="list-style-type: none"> • Some people with diabetes need to eat at about the same time each day. Others can be more flexible with the timing of their meals. Depending on your diabetes medicines or type of insulin, you may need to eat the same amount of carbohydrates at the same time each day. If you take “mealtime” insulin, your eating schedule can be more flexible. • If you use certain diabetes medicines or insulin and you skip or delay a meal, your blood glucose level can drop too low. Ask your health care team when you should eat and whether you should eat before and after physical activity.
<p>How much can I eat?</p>	<p>Eating the right amount of food will also help you manage your blood glucose level and your weight. Your health care team can help you figure out how much food and how many calories you should eat each day.</p>
<p>Weight-loss planning</p>	<ul style="list-style-type: none"> • If you are overweight or have obesity, work with your health care team to create a weight-loss plan. • The Body Weight Planner can help you tailor your calorie and physical activity plans to reach and maintain your goal weight. • To lose weight, you need to eat fewer calories and replace less healthy foods with foods lower in calories, fat, and sugar. • If you have diabetes, are overweight or obese, and are planning to have a baby, you should try to lose any excess weight before you become pregnant. Learn more about planning for pregnancy if you have diabetes.
<p>Meal plan methods</p>	<p>Two common ways to help you plan how much to eat if you have diabetes are the plate method and carbohydrate counting, also called carb counting. Check with your health care team about the method that’s best for you.</p> <p><i>Plate method</i></p> <ul style="list-style-type: none"> • The plate method helps you control your portion sizes. You don’t need to count calories. The plate method shows the amount of each food group you should eat. This method works best for lunch and dinner. • Use a 9-inch plate. Put non-starchy vegetables on half of the plate; a meat or other protein on one-fourth of the plate; and a grain or other starch on the last one-fourth. Starches include starchy vegetables such as corn and peas. You also may eat a small bowl of fruit or a piece of fruit and drink a small glass of milk as included in your meal plan. <p>You can find many different combinations of food and more details about using the plate method from the American Diabetes Association’s Create Your Plate. Your daily eating plan also may include small snacks between meals.</p> <p><i>Portion sizes</i></p> <p>You can use everyday objects or your hand to judge the size of a portion.</p> <ul style="list-style-type: none"> • 1 serving of meat or poultry is the palm of your hand or a deck of cards • 1 3-ounce serving of fish is a checkbook • 1 serving of cheese is six dice • 1/2 cup of cooked rice or pasta is a rounded handful or a tennis ball • 1 serving of a pancake or waffle is a DVD • 2 tablespoons of peanut butter is a ping-pong ball

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<p>Meal plan methods</p> <p><i>Continued</i></p>	<p><i>Carbohydrate counting (Also see Carbohydrates)</i></p> <p>Carbohydrate counting involves keeping track of the amount of carbohydrates you eat and drink each day. Because carbohydrates turn into glucose in your body, they affect your blood glucose level more than other foods do. Carb counting can help you manage your blood glucose level. If you take insulin, counting carbohydrates can help you know how much insulin to take.</p> <p>Carbohydrate counting is a meal planning tool for people with diabetes who take insulin, but not all people with diabetes need to count carbohydrates. Your health care team can help you create a personal eating plan that will best meet your needs.</p> <p>The amount of carbohydrates in foods is measured in grams. To count carbohydrate grams in what you eat, you'll need to:</p> <ul style="list-style-type: none">• Learn which foods have carbohydrates• Read the Nutrition Facts food label, or learn to estimate the number of grams of carbohydrate in the foods you eat.• Add the grams of carbohydrate from each food you eat to get your total for each meal and for the day. <p>Most carbohydrates come from starches, fruits, milk, and sweets. Try to limit carbohydrates with added sugars or those with refined grains, such as white bread and white rice. Instead, eat carbohydrates from fruit, vegetables, whole grains, beans, and low-fat or nonfat milk.</p>
<p>What is medical nutrition therapy?</p>	<ul style="list-style-type: none">• Medical nutrition therapy is a service provided by an RD to create personal eating plans based on your needs and likes.• For people with diabetes, medical nutrition therapy has been shown to improve diabetes management.• Medicare pays for medical nutrition therapy for people with diabetes. If you have insurance other than Medicare, ask if it covers medical nutrition therapy for diabetes.
<p>Will supplements and vitamins help my diabetes?</p>	<ul style="list-style-type: none">• No clear proof exists that taking dietary supplements such as vitamins, minerals, herbs, or spices can help manage diabetes.• You may need supplements if you cannot get enough vitamins and minerals from foods.• Talk with your health care provider before you take any dietary supplement since some can cause side effects or affect how your medicines work.

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Thank You to:

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Model

For his support through my battle with cancer and while writing this and previous books.
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My Daughter Kayla

For giving me artistic inspiration and providing artwork for my previous books.

My Grandchildren Skyler and Soren Just Because

God

For giving me the strength to overcome cancer and the wisdom to write these books.

Certifications, Continuing Education and License

Physical Therapist Assistant – L/PTA – 25 years in both Home Therapy and Short-Term Rehab facilities

ACE Certified Personal Trainer – CPT

- **Functional Training Specialist**
- **Therapeutic Exercise Specialist**
- **Senior Fitness Specialist**
- **Nutrition and Fitness Specialist**

©Klose Education

- **Certified Lymphedema Therapist – CLT**
- **Strength After Breast Cancer – Strength ABC**
- **Breast Cancer Rehabilitation**

©Cancer Exercise Specialist Institute – CETI

- **Cancer Exercise Specialist – CES**
- **Breast Cancer Recovery BOSU(R) Specialist Advanced Qualification**
- **Pilates Mat Certificate**

©Pink Ribbon Program

©The BioMechanics Method - Corrective Exercise Specialist