High Blood Pressure (Hypertension)

Blood pressure is a measure of how hard the blood pushes against the walls of your arteries as it moves through your body. It’s normal for blood pressure to go up and down throughout the day, but if it stays up, you have high blood pressure. Another name for high blood pressure is hypertension.

When blood pressure is high, it starts to damage the blood vessels, heart, and kidneys. This can lead to heart attack, stroke, and other problems. High blood pressure is called a “silent killer,” because it doesn’t usually cause symptoms while it is causing this damage.

Your blood pressure consists of two numbers: systolic and diastolic. Someone with a systolic pressure of 120 and a diastolic pressure of 80 has a blood pressure of 120/80, or “120 over 80.”

- The systolic number shows how hard the blood pushes when the heart is pumping.
- The diastolic number shows how hard the blood pushes between heartbeats, when the heart is relaxed and filling with blood.

 Adults should have a blood pressure of less than 120/80. High blood pressure is 140/90 or higher. Many people fall into the category in between, called prehypertension. People with prehypertension need to make lifestyle changes to bring the blood pressure down and help prevent or delay high blood pressure.

What Causes High Blood Pressure?

In most cases, doctors can’t point to the exact cause. But several things are known to raise blood pressure, including being very overweight, drinking too much alcohol, having a family history of high blood pressure, eating too much salt, and getting older.

Your blood pressure may also rise if you are not very active, you don’t eat enough potassium and calcium, or you have a condition called insulin resistance.

What Are the Symptoms?

High blood pressure doesn’t usually cause symptoms. Most people don’t know they have it until they go to the doctor for some other reason.

Without treatment, high blood pressure can damage the heart, brain, kidneys, or eyes. This damage causes problems like coronary artery disease, stroke, and kidney failure.

Very high blood pressure can cause headaches, vision problems, nausea, and vomiting. Malignant high blood pressure (hypertensive crisis), which is blood pressure that rises very fast, can also cause these symptoms. Malignant high blood pressure is a medical emergency.

How is High Blood Pressure Diagnosed?

Most people find out they have high blood pressure during a routine doctor visit. For your doctor to confirm that you have high blood pressure, your blood pressure must be at least 140/90 on three or more separate occasions. It is usually measured one to two weeks apart.

You may have to check your blood pressure at home if there is reason to think the readings in the doctor’s office aren’t accurate. You may have what is called white-coat hypertension, which is blood pressure that goes up just because you’re at the doctor’s office. Even routine activities, such as attending a meeting, can raise your blood pressure. So can commuting to work or smoking a cigarette.
How Is It Treated?

Treatment depends on how high your blood pressure is, whether you have other health problems such as diabetes, and whether any organs have already been damaged. Your doctor will also consider how likely you are to develop other diseases, especially heart disease.

You can help lower your blood pressure by making healthy changes in your lifestyle. If those lifestyle changes don’t work, you may also need to take pills. Either way, you will need to control your high blood pressure throughout your life.

• If you have prehypertension, your doctor will likely recommend lifestyle changes. These may include losing extra weight, exercising, limiting alcohol, cutting back on salt, quitting smoking, and eating a low-fat diet that includes more fruits, vegetables, whole grains, and low-fat dairy foods.

• If you have high blood pressure without any organ damage or other risk factors for heart disease, your doctor may recommend that you take medicine in addition to making lifestyle changes.

• If you have high blood pressure and have some organ damage or other risk factors for heart disease, you may need to try various combinations of medicines in addition to making big lifestyle changes.

Most people take more than one pill for high blood pressure. Work with your doctor to find the right pill or combination of pills that will cause the fewest side effects.

It can be hard to remember to take pills when you have no symptoms. But your blood pressure will go back up if you don’t take your medicine. Make your pill schedule as simple as you can. Plan times to take them when you are doing other things, like eating a meal or getting ready for bed.

What Can You Do to Prevent High Blood Pressure?

There are six lifestyle changes you can make to help prevent high blood pressure:

• Lose extra weight.
• Eat less salt.
• Exercise.
• Limit alcohol to two drinks a day for men and one drink a day for women and lighter-weight men.
• Get 3,500 mg of potassium in your diet every day. Fresh, unprocessed whole foods have the most potassium. These foods include meat, fish, nonfat and low-fat dairy products, and many fruits and vegetables.
• Follow the DASH eating plan (Dietary Approaches to Stop Hypertension). This diet is rich in fruits, vegetables, and low-fat dairy products and is low in fat.

Causes

Experts know that many different factors are linked to high blood pressure. But experts still don’t fully understand the exact cause. Factors that are linked to high blood pressure include:

• Aging.
• Drinking more than two alcoholic drinks a day for men or more than one alcoholic drink a day for women.
• Eating a lot of sodium (salt).
• Being overweight or obese.
• Having high cholesterol.
• Not exercising.
• Being under a lot of stress.
• Eating a diet low in potassium, magnesium, and calcium.
• Being insulin-resistant.
Primary, or essential, high blood pressure accounts for 95 percent of all cases of hypertension. Secondary high blood pressure, which is caused by another disease or medicine, is less common.

Elevated blood pressure readings may not always mean that you have high blood pressure. For some people, just being in a medical setting causes their blood pressure to rise. This is called white-coat hypertension.

**Symptoms**

People with primary (essential) high blood pressure usually do not have any symptoms. Most people with high blood pressure feel fine and only find out they have high blood pressure during a routine exam or a doctor visit for another problem.

Very severe high blood pressure (160 over 100 or higher), especially if your blood pressure rises very high quickly, may lead to hypertensive crisis. Symptoms of very severe high blood pressure include:

- Headaches, especially pulsating headaches behind the eyes that occur early in the morning.
- Visual disturbances.
- Nausea and vomiting.

Over time, untreated high blood pressure can damage organs, such as the heart, kidneys, or eyes. This may lead to:

- Chest pain (angina), heart attack, or heart failure.
- Stroke.
- Kidney (renal) failure.
- Peripheral arterial disease.
- Eye damage (retinopathy).

People with borderline, or “high-normal,” blood pressure (120–139/80–89)—which is now considered “prehypertensive”—have a higher risk for developing high blood pressure and heart disease than those with blood pressure less than 120/80 millimeters of mercury (mm Hg).

In addition, men who have high systolic blood pressure during middle age (50s to 60s) may show a greater decline in mental ability later in life (after age 75) than men who do not have high blood pressure earlier. Short-term memory and attention span are most affected.

Elevated blood pressure readings may not always mean you have high blood pressure. For some people, just being in a medical setting causes their blood pressure to rise. This is called white-coat hypertension.

Malignant hypertension (hypertensive crisis) is high blood pressure that increases rapidly. The cause may be unknown, or it may be caused by a medicine or another condition.

Isolated systolic high blood pressure is when systolic blood pressure is elevated above 140 mm Hg, but diastolic blood pressure stays at less than 90 mm Hg. This type of high blood pressure is more common in older adults, especially older women. If you are older than 50, a systolic blood pressure over 140 is a more important risk factor for heart disease and stroke than your diastolic blood pressure.
What Increases Your Risk

Risk factors for high blood pressure include:

- A family history of high blood pressure.
- Aging.
- Eating a lot of sodium (salt).
- Drinking more than 2 alcohol drinks a day for men or more than 1 alcohol drink a day for women.
- Being overweight or obese.
- Lack of exercise or physical activity.
- High cholesterol.
- Race. African Americans are more likely to develop high blood pressure, often have more severe high blood pressure, and are more likely to develop the condition at an earlier age than others. Why they are at greater risk is not known.

Other possible risk factors include:

- Low intake of potassium, magnesium, and calcium.
- Sleep apnea and sleep-disordered breathing.
- Depression.
- Long-term use of pain medicines like NSAIDs—for example, naproxen (such as Aleve) or ibuprofen (such as Motrin or Advil)—or COX-2 inhibitors, such as celecoxib (Celebrex). Aspirin does not increase your risk for developing high blood pressure.

People who have high blood pressure along with any of the following risk factors are at increased risk for developing complications, such as coronary artery disease, heart attack, abnormal heartbeat, stroke, kidney failure, and eye damage (retinopathy). These risk factors are:

- Cigarette smoking.
- High cholesterol or low HDL (“good”) cholesterol.
- Diabetes.
- A history of early coronary artery disease in a parent or sibling (before age 45 for men or age 55 for women).
- Being a male.
- Being an African American.
- Being overweight.
- Lack of exercise.
- Enlarged lower left heart chamber (left ventricle).

When to Call a Doctor

Call 911 or other emergency services immediately if you have any of the following symptoms:

- A sudden, severe headache
- Chest pain (angina)
- Other symptoms of a heart attack
- Symptoms of a stroke or transient ischemic attack (TIA)

Call a doctor immediately if you have high blood pressure and:

- Your blood pressure is usually normal or well controlled, but it suddenly goes well above the normal range on more than one occasion.
- Your blood pressure is 180/110 millimeters of mercury (mm Hg) or higher.

Call a doctor if:

- Your blood pressure is 140/90 mm Hg or higher on two or more occasions (taken at home or in a community screening program). If one blood pressure measurement is high, have another reading taken by a health professional to verify the first reading. Many doctors’ offices or clinics will take blood pressure measurements without an appointment.
You have significant side effects from any medicine you take for high blood pressure. The side effects may be so bad that you do not want to take your medicine anymore. Talk with your doctor before you stop taking your medicine.

Adults are encouraged to have their blood pressure checked regularly.

Who to See

Your blood pressure can be checked:

- At a clinic where you work or go to school.
- At health fairs, fitness centers, community centers, fire stations, and ambulance stations.
- By a nurse practitioner or physician assistant.
- By a primary care doctor.

For diagnosis and management of high blood pressure, see:

- A primary care doctor.
- An internist.
- A cardiologist (heart specialist). Generally, a cardiologist is needed only in cases of extremely high blood pressure or when the person has other serious heart problems.
- A nephrologist (kidney specialist), in extreme cases.
- A nurse practitioner.
- A physician assistant.

Exams and Tests

In most cases, extensive tests are not needed to diagnose high blood pressure. If a blood pressure measurement shows your systolic and/or diastolic blood pressure is high, usually two more measurements at separate times will be done to confirm that you have high blood pressure.

Routine Tests

A physical exam and a medical history are routinely used to evaluate high blood pressure. Additional blood tests and urine tests, such as urinalysis, also may be done before starting treatment to determine whether there has been damage to organs and to check for complications. These lab tests may include measurements of potassium, sodium (a component of salt), glucose (blood sugar), cholesterol levels, and tests to measure kidney function. Electrocardiogram (EKG, ECG) also may be done to determine whether there is any damage to the heart. Your doctor may want to check your risk of coronary artery disease.

In most people who have high blood pressure without any complications, routine lab test results will be normal. Sometimes, findings may suggest the presence of kidney disease, diabetes, or a hormone disorder.

If there is reason to suspect that blood pressure measurements taken in the doctor’s office do not represent your accurate blood pressure (for example, if you may have white-coat hypertension), you may need to get your blood pressure measured away from the doctor’s office.

In some cases, you may be asked to check your blood pressure at home three times a day and keep a record of the readings. If you are not able to measure your blood pressure accurately at home, you may need ambulatory blood pressure monitoring.

The U.S. Preventive Services Task Force recommended that people with high blood pressure or high cholesterol be routinely screened for diabetes. This recommendation is based on studies that show early detection and treatment of diabetes substantially decreases the risk of coronary artery disease in these people.7

Early Detection

Screening tests and programs for high blood pressure vary widely in reliability. Results from automated blood pressure testing, such as you might do at a grocery store or pharmacy, may not be accurate. Any high blood pressure measurement discovered during a blood pressure screening program needs to be confirmed by a doctor or another health professional.
Rechecking Blood Pressure

The Seventh Joint National Committee (JNC 7) on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommends:

- Healthy adults with normal blood pressure (119/79 millimeters of mercury [mm Hg] or below) should have their blood pressure checked at least every one to two years. This can be done during any routine medical visit.

- Adults who are prehypertensive (120 to 139 and/or 80 to 89 mm Hg) should have their blood pressure checked as often as recommended by their doctor, or at least yearly. This can be done during any routine medical visit.

- Adults with other risk factors for heart or blood vessel disease or evidence of disease caused by high blood pressure need to have their blood pressure checked more often.

Treatment Overview

Treatment for high blood pressure depends on the severity of the disease and whether you have other health problems, such as heart failure or diabetes, or you are pregnant. Your doctor may want you to try lifestyle changes first, including losing weight, increasing activity, and eating a balanced diet. If your blood pressure is above a certain level, your doctor may prescribe medicine along with the lifestyle changes.

Some people may only need lifestyle changes to control their high blood pressure, while others need medicine as well. Either way, treating high blood pressure usually is a lifelong process.

Treatment of primary high blood pressure, especially moderate or severe high blood pressure, decreases the risk of heart failure, coronary artery disease, heart attack, abnormal heartbeats, stroke, and kidney disease, and it reduces the risk of death from these conditions.

Overall, goals of treatment are to:

- Prevent death and disease associated with high blood pressure (heart disease, stroke, and kidney disease). High blood pressure is associated with 35 percent of heart disease caused by coronary artery disease and 49 percent of all cases of heart failure.
- Reduce systolic blood pressure below 140 millimeters of mercury (mm Hg) and diastolic blood pressure below 90 mm Hg. Studies have shown that lowering high blood pressure even further can lower the risk of death in people with diabetes and coronary artery disease. Lowering blood pressure in people with kidney disease can help keep the kidneys working. In these people, blood pressure should be lowered to less than 130/80 mm Hg.
- Control other risk factors, such as smoking, lack of exercise, and high cholesterol, that can lead to complications such as a heart attack and stroke.
- Minimize side effects of medicines.
- Live a full and active life.

Initial Treatment

If you fall into the prehypertension range (120–139/80–89), your doctor will likely recommend lifestyle changes, including:

- Losing excess weight.
- Exercising.
- Limiting alcohol to two drinks a day for men, and one drink a day for women.
- Cutting back on salt.
- Quitting smoking.
- Following the Dietary Approaches to Stop Hypertension (DASH) diet.

The DASH eating plan is a low-fat and low-saturated-fat diet that emphasizes eating more fruits, vegetables, whole grains, and low-fat dairy foods.

If you have high blood pressure (140–159/90–99 mm Hg) and you do not have any organ damage or other risk factors for heart disease (this is called uncomplicated high blood pressure), your doctor will likely recommend lifestyle changes and possibly medicines. Most people
with high blood pressure will need two or more medicines, including a thiazide-type diuretic, to lower their blood pressure to below 140/90 mm Hg, which is the goal for people with uncomplicated hypertension. If you have other conditions, such as diabetes, heart failure, or chronic kidney disease, your goal blood pressure is lower: 130/80 mm Hg.

If your blood pressure is 160–179/100–109 mm Hg or higher, you may need to try various combinations of medicines to find what works best for you. You will also need to make aggressive lifestyle changes.

Treatment of secondary high blood pressure varies depending on the cause. For example, treatment of high blood pressure caused by kidney disease will also include treating the kidney problem. If you have secondary high blood pressure, you may have to take blood pressure medicine long term, even if the underlying condition is treated.

People with high blood pressure who require special treatment considerations include:
- Older adults.
- African Americans.
- Children.
- Pregnant women.

Ongoing Treatment

Most cases of high blood pressure cannot be cured but can be controlled with lifestyle changes and medicine. Treatment is a lifelong process.

You may need to try several different medicines or combinations of medicines, such as ACE inhibitors, before finding the right combination that lowers your blood pressure to a safe level. If you have secondary high blood pressure, you may need treatment for the underlying condition.

You may need to work with a registered dietitian to successfully follow the Dietary Approaches to Stop Hypertension (DASH) diet.

It is important to follow the lifestyle changes your doctor recommends for the rest of your life to reduce your risk of heart disease and stroke.

People with heart disease and high blood pressure have a high risk for future heart problems and need aggressive treatment.

What to Think About

In older adults, even small decreases in systolic blood pressure may be enough to prevent complications, if their diastolic blood pressure is normal.

People who have high blood pressure are encouraged to make lifestyle changes and stick with them for the rest of their lives to reduce their blood pressure. Lifestyle changes such as eating a low-fat diet, quitting smoking, and exercising will help reduce the overall risk of heart disease and stroke and may reduce blood pressure significantly.

Treatment if the condition gets worse

Untreated high blood pressure can lead to fatal heart attacks or strokes. The higher your blood pressure, the greater your risk for these complications. Lowering blood pressure reduces the risk of damaging blood vessels and developing atherosclerosis.

As your high blood pressure rises, you may need to take higher doses of medicine or a combination of medicines. Many people take a combination of several medicines.

Prevention

Lifestyle changes can help you prevent high blood pressure. These changes are especially important for people who have risk factors for high blood pressure that cannot be changed, including family history, race, or age.

Lifestyle changes include:
- Maintaining a normal weight, with a body mass index (BMI) of 18.5 to 24.9.
- Reducing sodium in your diet to about 2.3 g (2300 mg) a day, which is about one teaspoon of salt.
- Exercising—such as brisk walking—that raises your heart rate for at least 30 minutes a day on most, preferably all, days of the week.
• Limiting alcoholic drinks to two drinks a day for men, and one drink a day for women.
• Getting 3,500 mg of potassium in your diet every day.

Following the Dietary Approaches to Stop Hypertension (DASH) eating plan, a diet that is rich in fruits, vegetables, and low-fat dairy products, with reduced amounts of saturated and total fats.

**Living With High Blood Pressure**

Home treatment is important to help control high blood pressure, especially if you have other risk factors for heart disease and stroke. Even if your doctor has prescribed medicine for you, there are still many steps you can take to lower your blood pressure and reduce your risk of heart attack and stroke. Changes in lifestyle or behavior can help control high blood pressure and in some cases may allow you to reduce the amount of medicine you need.

• Maintain a healthy weight.
• Get regular exercise.
• Avoid using too much sodium.
• Get enough potassium, calcium, and magnesium in your diet.
• Limit alcohol use.
• Stop smoking.
• Use anti-inflammatory medicines wisely.
• Learn to check your blood pressure at home.
• Reduce stress.
• Follow the nutrition guidelines for hypertension (including the Dietary Approaches to Stop Hypertension, or DASH, diet).

**Medications**

Deciding whether to treat high blood pressure with medicine and choosing the best medicine are based mainly on:

• Your blood pressure measurement.
• Whether you have signs of organ damage caused by high blood pressure in other parts of your body, such as an enlarged heart or early damage to your arteries, kidneys, or eyes.
• Whether you have other medical conditions, such as heart disease, diabetes, or kidney or lung disease or risk factors for heart disease, such as diabetes or high cholesterol.
• Whether you think you can be successful in making lifestyle changes.

Doctors may have different opinions about when to start medicines for high blood pressure.

• Lifestyle changes alone may be tried before medicine if you have prehypertension (120–139/80–89 millimeters of mercury [mm Hg]) or high blood pressure (140/90 mm Hg), if you do not have other risk factors for heart disease, and if there's no evidence of organ damage.

• Treatment with medicine is often started in addition to lifestyle changes if you have other risk factors for heart disease, if there is evidence of damage to organs, or if you have stage one or two high blood pressure.

Doctors usually prescribe a single, low-dose medicine first. If blood pressure is not controlled, your doctor may change the dosage or try a different medicine or combination of medicines. It is common to try several medicines before your blood pressure is successfully controlled. Many people need more than one medicine to get the best results. African Americans with blood pressure that is higher than 10 to 15 mm Hg above their goal may need to take a combination of medicines first.
**Medication Choices**

Medication choices include:

- Diuretics.
- ACE inhibitors.
- Angiotensin II receptor blockers (ARBs).
- Beta-blockers.
- Calcium channel blockers.
- Vasodilators.
- Direct renin inhibitors.

All of these medicines are effective for lowering the risk of heart attack and stroke. Treatment for high blood pressure must be highly individualized and based on your risk factors, such as diabetes, smoking, and heart disease. Although one study may recommend a particular medicine as the first line of treatment, it may not be best for you based on your medical condition. What's most important is that you work with your doctor to find the right medicine or combination of medicines that have the fewest side effects and work well for you and that you take your medicines regularly as prescribed.

High blood pressure guidelines from the Seventh Report of the Joint National Committee (JNC 7) on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommend that, for most people, one of the medicines be a thiazide-type diuretic.

If other conditions, such as heart failure or diabetes, are present, ACE inhibitors or ARBs often are used as the first line of therapy because the other medical conditions also may benefit from these medicines. But isolated systolic hypertension may respond best to diuretics alone.

**Surgery**

There is no surgical treatment for primary (essential) high blood pressure. Treatment for the various secondary causes of high blood pressure, such as narrowing of the kidney arteries or diseases of the adrenal gland, may include other medicines and/or surgery.

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**What to Think About**

- Your doctor may choose which medicine to give you for high blood pressure based on whether you have any other related conditions. For example, doctors often prescribe ACE inhibitors for people with diabetes or heart failure.
- Some people who develop a cough while taking ACE inhibitors do well with ARBs, which usually do not cause a cough.
- Strategies for treating high blood pressure in pregnant women are quite different.
- Some experts believe a combination of medicines, each given in a lower dose, is better for reducing blood pressure than a higher dose of a single medicine. Because the medicines that are combined are given in a lower dose, there may be fewer side effects from the drugs.
- Check with your doctor before taking any nonsteroidal anti-inflammatory drugs (NSAIDs) with high blood pressure medicines. NSAIDs may raise blood pressure and lower the effectiveness of blood pressure medicines.

**Other Treatment**

In addition to making lifestyle changes, several other nondrug methods of reducing blood pressure can be tried.

- None of the methods listed below are proven to consistently lower high blood pressure. But these methods generally are considered to be safe and may have other benefits besides lowering blood pressure.
• Although there may be an association between a particular stressful situation and high blood pressure, this does not prove that changing the situation will affect blood pressure.

• Because it is simple to check your blood pressure, you can easily monitor the effects of these methods on lowering your blood pressure.

**Other Treatment Choices**

Alternative or complementary medicine therapies that help reduce stress and improve quality of life may have some effect on blood pressure. These therapies include:

• Acupuncture.

• Biofeedback.

• Guided imagery.

• Hypnosis.

• Meditation.

• Stress management.

• Yoga.

Although eating garlic and onions has been recommended to reduce blood pressure, evidence shows that only very small decreases in blood pressure may result. Fish oil (omega-3 fatty acids) also may have some effect on lowering blood pressure.

Potassium, calcium, and magnesium. Not eating enough foods containing potassium, calcium, and magnesium may contribute to high blood pressure. Most people will get enough of these minerals by eating a balanced diet that contains plenty of fresh fruits, vegetables, dairy foods, whole grains, and legumes (cooked dried beans and peas). Or you may take supplements.

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**What to Think About**

Many of the complementary medicine options listed above are inexpensive and probably not harmful. But it is best to work with your doctor when using these other methods along with traditional medical therapies.

The safest way to ensure good nutrition is through a balanced, varied diet instead of through nutritional supplements.

Acupuncture is currently being studied, and it shows some promise in lowering blood pressure.