University Hospitals
Harrington Heart & Vascular Institute

Hypertension (High Blood Pressure)

Patient Guide

ABOUT THIS GUIDE

This booklet is intended to offer general health information for educational purposes only and does not replace the medical advice of your doctor or healthcare team. Please do not change your treatment plan before discussing with your healthcare provider.

EARLY DETECTION IS KEY

Hypertension (high blood pressure) affects almost half of all adults in the United States. However, nearly half of those affected aren't aware they have it. The good news is that it's very treatable, and in some early cases, even reversable.

Although more common in older people, hypertension can occur in anyone – young, old, fit, not-so-fit, thin and overweight. That is why it's important to have your blood pressure checked regularly, ideally at your annual physical exam with a primary care provider.

WHAT IS BLOOD PRESSURE?

Blood pressure is determined by the amount of blood your heart pumps and the amount of resistance to that blood as it flows through your arteries. The more blood your heart pumps and the narrower your arteries, the higher your blood pressure will be.

Hypertension occurs when there is resistance to the flow of blood from the heart to the rest of the body, putting excessive pressure on the walls of the arteries. This increases the workload of the heart and blood vessels, making them less efficient.

There are two types of hypertension:

- **Primary hypertension** is what most adults have in which genetics and lifestyle factors like poor diet, prolonged stress, excessive alcohol consumption and tobacco use contribute to high blood pressure.
- **Secondary hypertension** is high blood pressure due to a medical condition like obstructive sleep apnea, kidney disease or thyroid disorder, or use of medications like steroids, antidepressants and some hormonal birth control.

Hypertension rarely causes symptoms unless it is very high for a long time. If left undiagnosed or untreated, long-term high blood pressure can lead to heart disease, heart failure, stroke, kidney disease, blindness and even death.

Understanding Blood Pressure Numbers

A BLOOD PRESSURE READING CONSISTS OF TWO NUMBERS:

Systolic: The first (top) number measures the pressure in your arteries when your heart beats.

Diastolic: The second (bottom) number measures the pressure in your arteries when your heart rests between beats.

Guidelines for evaluating blood pressure readings for most adults:

	Systolic Blood Pressure (SBP)		Diastolic Blood Pressure (DBP)
Normal Blood Pressure	Less than 120 mm Hg	AND	Less than 80 mm Hg
Elevated Blood Pressure	120 to 129 mm Hg	AND	Less than 80 mm Hg
Stage 1 Hypertension	130 to 139 mm Hg	OR	80 to 89 mm Hg
Stage 2 Hypertension	140 mm Hg or higher	OR	90 mm Hg or higher
Hypertensive Crisis	180 mm Hg or higher	OR	120 mm Hg or higher

Hypertension is not diagnosed based on one reading. If your blood pressure is high during an office visit, your doctor will perform a physical exam and take your health history. Be sure to share information about any relatives who have high blood pressure, and any other conditions you have that might affect your blood pressure.

Your doctor may also ask you to measure and record your blood pressure at home. Multiple readings taken at different times of the day help confirm if you have hypertension.

If you are diagnosed with hypertension, other tests may be ordered, including:

- Complete blood count
- Serum electrolytes, potassium, sodium, calcium
- Creatinine and glomerular filtration rate to assess kidney function
- Lipid/cholesterol profile
- Blood glucose or hemoglobin A1c
- Thyroid-stimulating hormone
- Urinalysis, including urine albumin-creatinine ratio (UACR)
- Electrocardiogram (ECG)

Types of Doctors for Blood Pressure Management

Primary care physicians are often the first to diagnose high blood pressure, as they usually take a blood pressure reading during routine appointments. They will perform a physical exam, review your health history, as well as order any necessary diagnostic tests. They can also provide advice on lifestyle changes to help keep your blood pressure in check and prescribe medication to help control your blood pressure if needed.

If there are additional concerns about your heart health, your primary care physician may refer you to a **cardiologist**. You may want to make an appointment with a cardiologist if:

- You have high blood pressure that isn't controlled by your current medication or lifestyle changes
- You have a history of heart disease or heart attacks in your family
- You also have high cholesterol levels or diabetes
- You are experiencing other symptoms such as swelling in the legs or feet, shortness of breath, irregular heartbeats, headaches, or lightheadedness, which can signal other heart-related problems

Your primary care physician may refer you to a **nephrologist** for a kidney evaluation, especially if your blood pressure is not under control despite taking several blood pressure-lowering medications or if you or someone in your family has known kidney disease.

CHOOSING A HOME MONITORING DEVICE
Scan the QR code or visit **validatebp.org/devices/list** to learn more about the American Medical Association's validated list of devices for home blood pressure monitoring.

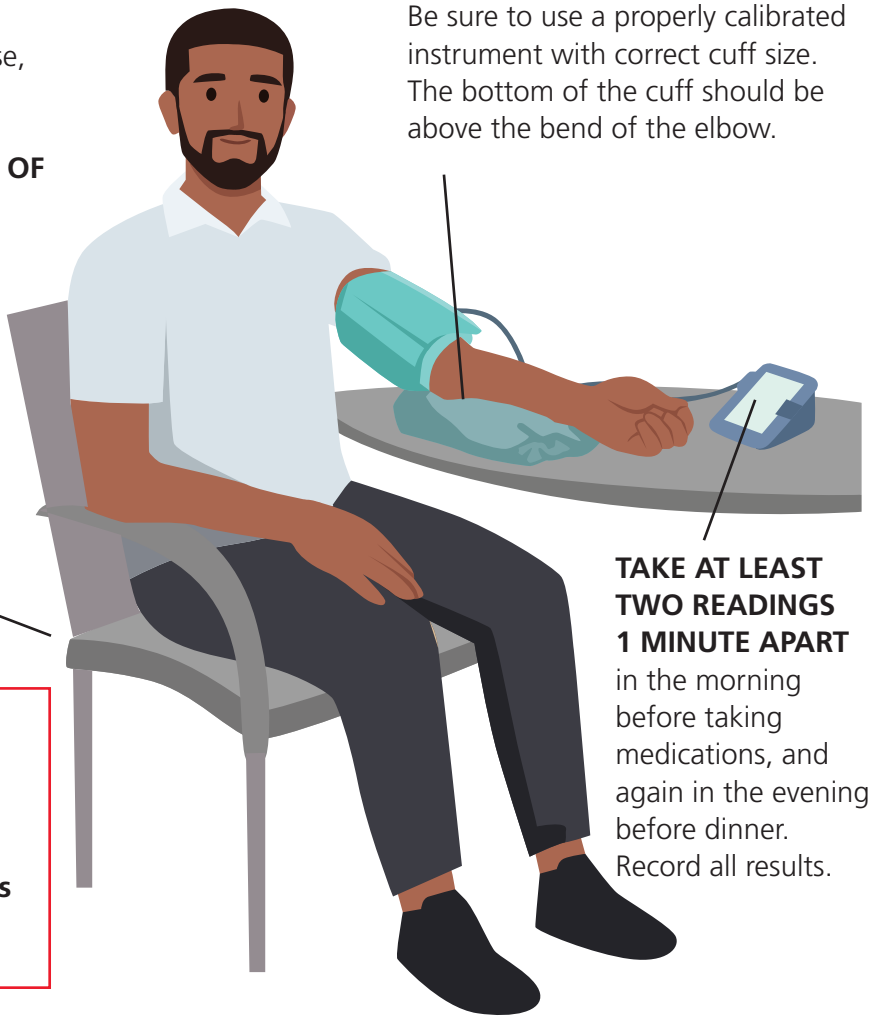
How to Measure Your Blood Pressure

When your heart beats, it pumps blood to the arteries and creates pressure within them. The higher (systolic) number represents the pressure while the heart is beating. The lower (diastolic) number represents the pressure when the heart is resting between beats. A high blood pressure (hypertension) increases the risk of stroke, congestive heart failure, kidney failure and heart attack.

Don't smoke, exercise, drink caffeinated beverages or alcohol within **30 MINUTES OF MEASUREMENT**.

Be sure to use a properly calibrated instrument with correct cuff size. The bottom of the cuff should be above the bend of the elbow.

Make sure you are relaxed. Sit still in a chair for five minutes with your legs uncrossed and feet flat on the floor. Rest your left arm on a flat surface at heart level. Your back should be straight and supported. Do not talk.



TAKE AT LEAST TWO READINGS 1 MINUTE APART in the morning before taking medications, and again in the evening before dinner. Record all results.

If your blood pressure is higher than 180/120 mmHg, contact your doctor immediately, as this indicates a hypertensive crisis.

Risk Level	Blood Pressure (systolic/diastolic)	Recommendation
Normal	Less than 120 / less than 80	Routine follow-up with physician.
Elevated	120-129 / less than 80	Increase physical activity and reduce sodium in diet. Retest within two weeks and review results with physician.
Stage 1 Hypertension	130-139 / 80-89	See physician for evaluation & treatment options.
Stage 2 Hypertension	140 or higher / 90 or higher	See physician for evaluation & treatment options. If new onset: Call 9-1-1 or go to the nearest ER.

High Blood Pressure Emergencies

Hypertension is typically a chronic condition, slowly causing damage over time. Sometimes though, blood pressure rises very quickly and seriously. When this happens, it becomes a medical emergency and treatment is needed right away.

In emergency situations, high blood pressure can cause:

- Pulmonary edema
- Blindness
- Loss of consciousness
- Pregnancy complications (preeclampsia or eclampsia)
- Sudden loss of kidney function
- Aortic dissection
- Heart attack
- Stroke

If you experience a sudden increase in your blood pressure, or have any related symptoms, call 9-1-1 so you can be taken to the nearest emergency room.

Treating Hypertension

If you have been diagnosed with hypertension, your doctor will make recommendations for treatment that depend on the severity of your high blood pressure.

LIFESTYLE CHANGES

"Elevated" or "stage 1 hypertension" can often be managed with lifestyle changes:

Eat a heart healthy, low-fat, low-sodium diet

Get regular physical activity

Maintain a healthy weight

Reduce or eliminate alcohol and caffeine

Quit tobacco use

If lifestyle changes alone do not effectively manage your blood pressure, one or more medications may be prescribed, in addition to these lifestyle changes.

Treating Hypertension

MEDICATIONS

There are many medications to treat hypertension that work in different ways to lower blood pressure. Here are the most common types and a brief explanation of how they work:

Thiazide Diuretics

Diuretics help the body get rid of excess sodium (salt) and water to help control blood pressure. Thiazide diuretics act directly on the kidneys to promote fluid removal through urination. They are often used in combination with other antihypertensive medications. (Note: Over-the-counter diuretics, often sold as "water pills" are not regulated and, therefore, not recommended.)

ACE Inhibitors

ACE stands for angiotensin-converting enzyme. Angiotensin is a chemical that causes the arteries to become narrow throughout the body, especially in the kidneys. ACE inhibitors help the body produce less angiotensin, which helps the blood vessels relax and open, which, in turn, lowers blood pressure.

Angiotensin II Receptor Blockers (ARBs)

As mentioned above, angiotensin is a chemical that narrows the arteries. ARBs block the effect the chemical has on the blood vessels, preventing constriction and allowing them to remain open, thus reducing blood pressure.

Calcium Channel Blockers

When calcium enters the smooth muscle cells of the heart, it causes stronger, harder contractions. Calcium channel blockers prevent calcium from entering the heart cells resulting in less forceful contractions and reduced heart rate. Calcium channel blockers also relax and open up narrowed blood vessels which, together with the lower heart rate, helps to lower blood pressure.

Beta Blockers

Beta-blockers cause the heart to beat more slowly and with less force. This lessens the heart's output of blood and widens blood vessels, both of which can lower blood pressure. Beta blockers are often most effective when combined with other blood pressure medications.

These five medication types are the most common but there are many other types of medications that may be recommended for you. You may require more than one medication to effectively manage your blood pressure. Your doctor will work with you to find the right medication or combination of medications and the right dosage to get your hypertension under control.

Medications

IMPORTANT TO KNOW WHEN TAKING MEDICATIONS

- Take medicines as prescribed by your doctor.
- Report any side effects to your care team.
- Do not stop taking prescribed medicines without talking to your doctor.
- Know what to do if you miss a dose of prescribed medicine.

Also, be sure to go to your scheduled follow-up visits. Your doctor needs to monitor your progress and make sure your medicines are working. During your visit, share and review a complete list of all the medicines you take, including over-the-counter medicines and supplements. Review your treatment plan, home blood pressure readings and target blood pressure numbers at each visit.

AVOID THESE MEDICATIONS

- Do not take medicines with high blood pressure warnings.
- Do not take medicines with heart stimulants.
- Do not take cold medicines with decongestants as they can increase your blood pressure. Some common decongestants are Sudafed (pseudoephedrine), ephedrine or phenylephrine. You may also see a D in the name of the medicine, like Claritin-D.
- Do not take non-steroidal anti-inflammatory medicines (NSAIDs). NSAIDs include Ibuprofen, Advil, Naproxen, Aleve and aspirin. If you take an aspirin for your heart, keep taking it only as instructed by your doctor.

Renal Denervation

In some cases, despite lifestyle changes and multiple medicines, blood pressure may remain high. This is called resistant hypertension.

For these patients, a one-time, minimally invasive procedure called renal denervation may be a treatment option to help lower blood pressure.

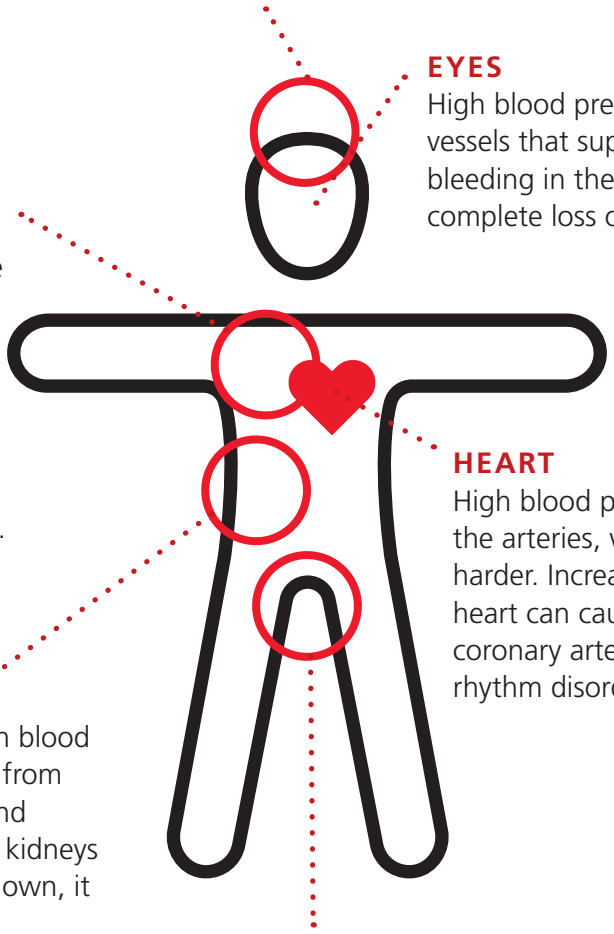
The procedure usually takes one to two hours. The patient is given light sedation (not general anesthesia), and then a doctor will make a small incision in the groin and insert a thin, plastic tube (catheter) that is carefully guided to the blood vessels supplying blood to the kidneys. Heat is applied to disrupt the nerves without damaging the arteries. No stents or implants are used or left behind, and most people can go home the same day.

In clinical studies, renal denervation has been shown to be safe and as effective as a single blood pressure medicine in lowering blood pressure for appropriate patients. Your doctor will review your health and discuss if this option is right for you.

How Hypertension Can Affect Your Body

BRAIN
The brain depends on proper blood supply to function. As high blood pressure damages the blood vessels, the blood supply to the brain may become blocked, resulting in a transient ischemic attack (TIA), called a ministroke, or a full-blown stroke. Narrowed or blocked arteries can also lead to mild cognitive impairment or vascular dementia.

ARTERIES
Arteries support blood flow that supplies organs and tissues with oxygen and nutrients. Over time, high blood pressure damages the artery walls, causing arteries to weaken, bulge, or become rigid. This leads to restricted or blocked blood flow throughout the body. If an affected artery wall bursts open, it can cause life-threatening internal bleeding.



EYES
High blood pressure can damage the blood vessels that supply blood to the eyes, causing bleeding in the eye, blurred vision or even complete loss of vision.

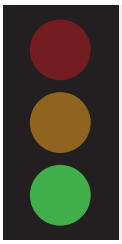
HEART
High blood pressure narrows and damages the arteries, which forces the heart to work harder. Increased pressure and strain on the heart can cause many conditions, including coronary artery disease, heart failure, heart rhythm disorder or heart attack.

KIDNEYS
Damaged blood vessels from high blood pressure can prevent the kidneys from being effective at filtering fluid and waste from the blood. When the kidneys don't work well enough on their own, it can lead to kidney failure.

SEXUAL CONDITIONS
High blood pressure can limit or block blood flow to the penis, resulting in erectile dysfunction. Similarly, high blood pressure can reduce blood flow to the vagina, leading to less sexual arousal, vaginal dryness, or trouble having orgasms.

Stay Healthy at Home: Blood Pressure Zones

Always monitor your health and be aware of new or worsening health concerns.
Read below to learn when and who to call for help.



GREEN ZONE: GOOD TO GO

- Blood pressure readings are within goal range
- Taking medicines as prescribed
- Following lifestyle modifications as discussed with your doctor
- Keeping follow-up appointments with care team

YELLOW ZONE: CAUTION

Call your doctor's office right away if you have any of these problems:

- Blood pressure readings are outside goal range:

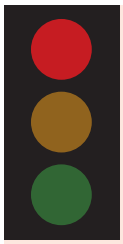
Lower than _____ or higher than _____

- Pounding or a rushing sound in your ears
- Feeling more tired or having less energy
- Mild dizziness
- Dull headaches
- Nose bleeds
- Nausea (feeling sick to your stomach)
- Urinating less often or urine is brown
- Any other symptom that causes concern

Your doctor may need to adjust your medicine doses and/or order blood tests. Keep taking your medicines as ordered until you see your doctor.

My doctor's name: _____

My doctor's office phone number: _____



RED ZONE: MEDICAL ALERT

Call 9-1-1 right away if you have any of these problems:

- Chest pain
- Feeling short of breath or it's hard to breathe
- Fainting or feeling like you will pass out
- Numbness or weakness in the face, arm, or leg, especially on one side of the body
- Confusion or trouble speaking
- Blurred vision or trouble seeing in one or both eyes
- Difficulty walking, dizziness, loss of balance, or lack of coordination
- Severe headache with no known cause

8 Ways to Improve Your Blood Pressure

1. Avoid tobacco. Smoking increases blood pressure. If you are unable to break the habit on your own, talk with your doctor about ways to quit.

2. Be active. Moderate physical activity can specifically help regulate your blood pressure. If you aren't currently physically active, take baby steps when you begin and work up to at least 90 to 150 minutes of physical activity each week. Examples of aerobic exercise that can help lower blood pressure include walking, jogging, cycling, swimming and dancing. Strength training can also help lower blood pressure. Aim to include strength training exercises at least two days a week. Talk to your doctor before starting a new exercise routine.

3. Aim for a healthy weight. If you're overweight, losing even just 5 to 10 percent of your current weight has been shown to improve blood pressure.

4. Eat well. Choose a variety of fruits and vegetables, poultry without skin and lean meats (for red meat and pork, choose cuts labeled "loin" and "round" for the least amount of fat). Enjoy at least 8 ounces of fish (not fried) each week such as salmon, trout, albacore tuna and sardines. Include whole grain bread, cereal, pasta and brown rice as well as fat-free, 1 percent and low-fat milk products. Add unsalted nuts, seeds, legumes and fiber to your diet. Limit alcohol and caffeine (one drink a day for women, two drinks a day for men). Broil, roast or grill instead of pan-frying. Use non-tropical vegetable oils (canola, corn, olive or safflower).

5. Cut down on salt. If you eat too much sodium (salt), the extra water stored in your body raises your blood pressure. Aim to consume less than 1,500 mg of salt a day. Even reducing your daily intake by 1,000 mg can help.

6. Manage stress. Long-term stress causes the heart rate to increase and blood pressure to rise. Learn how to manage your stress by practicing relaxation techniques. Don't try to do too much; plan your day and focus on your most important tasks. Learn to say no. Focus on issues you can control and make plans to solve them. Stay away from stress triggers. Make time for enjoyable activities or hobbies.

7. Get good sleep. Good sleep fuels your metabolism, hormone balance and energy level. Improved energy supports an active lifestyle. Balanced hormones support your metabolism, healthy eating habits and mood. Adults should get between 7 and 9 hours of sleep every night. Try to stick to a sleep schedule; go to bed and wake up at the same time each day. Create a restful space that is cool, quiet and dark. Do something relaxing in the hour before bedtime. Turn off or dim bright light from TVs or phones.

8. Have regular checkups. Routine checkups, including blood work, help detect health issues early on, reducing your risk of stroke, heart disease and heart attack. Also, if a healthy lifestyle is not enough, or if your high blood pressure is due to family history, you may be prescribed one or more medications to help manage this condition. Since your body chemistry and weight can change as you age, regular visits can help your doctor adjust any dosages or address side effects of medications if needed.

Questions to Ask Your Care Team

- What is my blood pressure goal?
- Should I check my blood pressure at home? If so, what's the best device to use for accurate readings and how often should I check it?
- What medicine(s) do I need to take and for how long?
- What should I do if I miss a dose?
- What side effects can I expect? When should I contact my doctor if I have side effects?
- Will I need blood work after starting certain medicines? If so, why?
- What should my daily sodium intake be?
- Are there foods that help naturally lower blood pressure?
- If carrying extra weight can raise blood pressure, what's a good goal weight for me?
- What type of physical activity is best to lower my blood pressure?
- What can I do to lower my stress levels?

Resources

Scan the QR codes for additional resources.

American Heart Association: Healthy Living

University Hospitals Tobacco Treatment and Counseling Program

University Hospitals Center for Integrated and Novel Approaches in Vascular-Metabolic Disease (UH CINEMA)

University Hospitals
Harrington Heart & Vascular Institute