MAYO CLINIC

MAYO CLINIC WOMEN'S HEALTHSOURCE

Special Report

Supplement to Mayo Clinic Women's HealthSource

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Hypertension

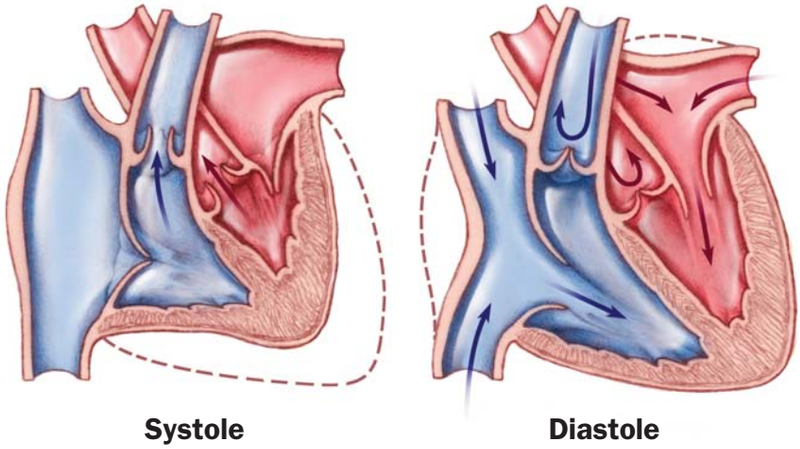
The Importance of Blood Pressure Awareness, Control

Over the years, you may have given little thought to your blood pressure. In fact, many women mistakenly think that high blood pressure (hypertension) is more of a concern for men. That may be because until women reach about age 55, they're less likely than are men to have this condition. Yet even if you've had normal blood pressure up until now, it's important not to take this aspect of your health for granted.

In fact, as you get older, it becomes even more important to pay attention to your blood pressure numbers, even if you're feeling just fine. That's because after the onset of menopause, your risk of hypertension increases. Yet it's possible to not notice changes in your blood pressure until damage already has been done to your heart, blood vessels, kidneys or other organs.

Recent studies have shown that more people with hypertension are aware that they have a problem and are taking medications to control it. However, hypertension still is a prevalent condition and a major risk factor for heart attack, stroke, chronic kidney disease and other life-threatening complications.

In the U.S. alone, hypertension affects about 65 million people, according to recent figures from the National Health and Nutrition Examination Survey. That's about 30 percent of the population. Millions of others have mildly elevated blood pressure (prehypertension), which signals an increased risk of progressing to hypertension in the future. In this Special Report, we'll explain when blood pressure readings are a cause for concern, what increases the risk of hypertension, and how blood pressure can be lowered or kept under control.



Systole **Diastole**

When your blood pressure is taken, you'll see it listed as one number over another. The top number represents your systolic pressure — or the pressure that occurs when your heart beats while pumping blood. The bottom number represents your diastolic pressure — or the pressure that occurs when your heart is at rest between beats.

Blood pressure basics

Every time your heart beats, it pumps blood into your arteries so that it can be

Cutting Back on Sodium

Your body needs some sodium to function properly. However, if you get too much sodium, it can accumulate in your blood and increase blood volume. This makes it harder for your heart to move blood through your blood vessels and increases pressure in your arteries.

On average, Americans eat about 3,600 milligrams (mg) of sodium a day. That's more than double the 1,500 mg a day that's recommended by the American Heart Association. To cut back on the amount of sodium in your diet:

- Eat more fresh foods and fewer processed foods. Most fresh fruits and vegetables are naturally low in sodium.
- Limit use of sodium-laden condiments. This includes soy sauce, bottled salad dressings, ketchup and many other sauces and dips.
- Use other flavorings to enhance the taste of foods. Many seasonings — such as dried herbs, spices and the zest from citrus fruit — can be used instead of salt to make foods more flavorful.
- Check labels. If you buy processed foods, choose low-sodium or sodium-free options when possible. Also, watch out for items labeled "reduced sodium" or "light in sodium." If the regular product started out high in sodium, reducing it by 25 or even 50 percent may make little difference.

Although cutting back on sodium can be difficult at first, your taste buds will adjust. In fact, after a few weeks of making do with less, some foods you once loved may taste too salty. ■

distributed to the rest of your body. Your blood pressure is determined by the amount of blood your heart pumps and the amount of resistance to blood flow in your arteries.

When your blood pressure is taken, you'll see it listed as one number over another. The top number represents your systolic pressure — or the pressure that occurs when your heart beats while pumping blood. The bottom number represents your diastolic pressure — or the pressure that occurs when your heart is at rest between beats.

If you're a healthy adult, a blood pressure reading of less than 120/80 millimeters of mercury (mm Hg) is considered normal. If your blood pressure is between 120/80 mm Hg and 139/89 mm Hg, you have prehypertension. This means that you don't have hypertension now, but are likely to develop it in the future if you don't take measures to control your blood pressure. A blood pressure reading of 140/90 mm Hg or more is defined as either stage 1 or stage 2 hypertension, depending on the height of your systolic and diastolic blood pressure numbers. (See By the Numbers, below.)

When you're age 50 or older, it's common to develop isolated systolic hypertension. This occurs when your systolic blood pressure reaches 140 mm Hg or higher and your diastolic pressure remains within normal range — less than 90 mm Hg. At younger ages, it's more common to have diastolic hypertension. With this type of hypertension, systolic pressure is less than 140 mm Hg and diastolic pressure is 90 mm Hg or more. For years, doctors focused primarily on high diastolic blood pressure. However, it's now known that high systolic pressure can be just as dangerous if not properly treated.

By the Numbers

Two numbers represent your blood pressure. The first, or top, number measures the pressure in your arteries when your heart beats (systolic pressure). The second, or bottom, number measures the pressure in your arteries between beats (diastolic pressure). The chart below lists what numbers are considered normal and what numbers indicate you have blood pressure that's elevated (prehypertension) or too high (hypertension).

Blood Pressure Category	Systolic Pressure (Top Number)		Diastolic Pressure (Bottom Number)
Normal	Less than 120	and	Less than 80
Prehypertension	120-139	or	80-89
Stage 1 Hypertension	140-159	or	90-99
Stage 2 Hypertension	160 or more	or	100 or more

All numbers listed are in millimeters of mercury (mm Hg) — the unit used to measure blood pressure. ■

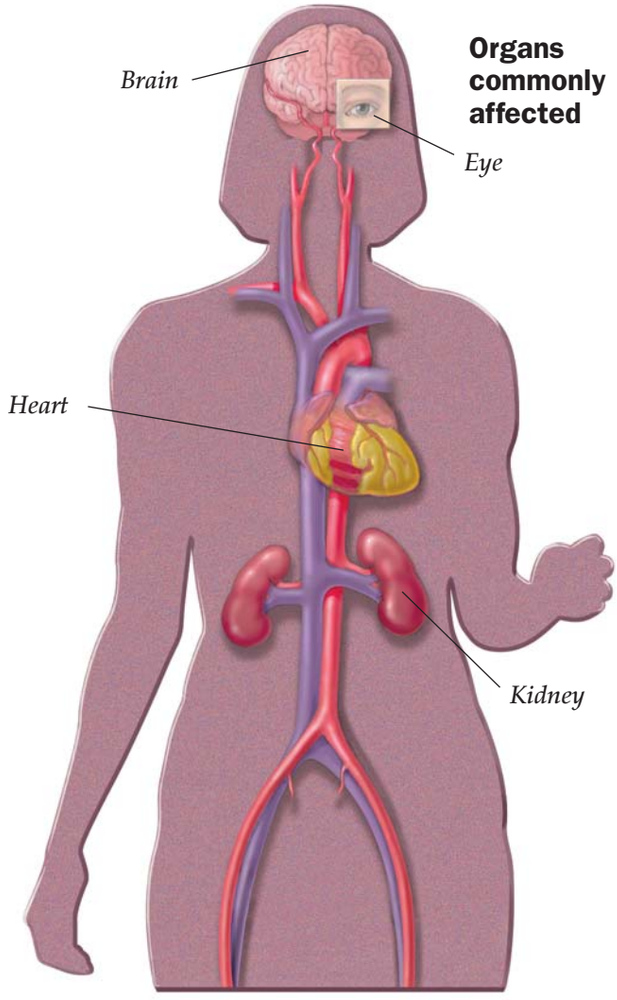
What increases risk?

Numerous factors can raise your risk of hypertension, including:

- *Age.* The chance of developing hypertension increases in women age 55 and older and in men age 45 and older. In the U.S. more than half of adults age 60 and older have hypertension.
- *Race.* Although hypertension can affect anyone, it occurs more often in black adults than it does in white or Hispanic adults. Black adults also tend to develop hypertension earlier in life, have more-severe cases of hypertension and have higher rates of premature death from hypertension-related complications.
- *Family history.* You're more at risk of hypertension if your parents or other immediate blood relatives have had the condition.
- *Excess weight.* Being overweight or obese increases your likelihood of developing hypertension or prehypertension. This is because the more you weigh, the more blood you need to supply oxygen and nutrients to your tissues. As the volume of blood circulated through your blood vessels increases, so does the pressure on your artery walls.
- *A sedentary lifestyle.* If you're not physically active, you're likely to have a higher heart rate. The higher your heart rate, the harder your heart must work with each contraction — putting more force on your arteries as blood is pumped out. Being inactive also increases your risk of being overweight or obese.
- *Smoking.* Every time you smoke, your blood pressure can go up temporarily. The chemicals in tobacco also can lead to a more lasting increase in blood pressure by damaging the lining of your artery walls. This can happen whether you use tobacco yourself or are exposed to secondhand smoke.
- *A high-sodium diet.* Too much sodium can cause your body to retain fluid, which increases blood pressure. (See Cutting Back on Sodium, page 2.)
- *Heavy alcohol use.* Over time, drinking too much alcohol can damage your heart and affect your blood pressure.
- *Stress.* Blood pressure can go up during stressful situations. However, some research has indicated that a high-stress life also can have an effect on heart and blood vessel health. This may be especially true of people who cope with everyday stress by engaging in unhealthy behaviors, such as overeating, drinking and smoking.
- *Certain conditions or medications.* In some cases, hypertension can be caused by other conditions that existed first — such as chronic kidney disease, an excess of certain hormones or sleep apnea. This is what's called secondary hypertension. In addition, blood pressure may be affected by some medications, including antidepressants, decongestants, over-the-counter pain relievers and herbal supplements. (See Medication Warning, page 5.) In some women, blood pressure can go up during pregnancy and lead to pregnancy-induced hypertension.

Health implications

Unfortunately, you can have hypertension for years and not know it. That's because the condition — which is often called a silent killer — usually has no symptoms. In fact, some people only learn that they have hypertension after developing one of these complications:



Untreated hypertension primarily attacks your brain, eyes, heart and kidneys. It can lead to heart attack, stroke, kidney failure, eye damage and dementia.

Home Blood Pressure Monitoring

Checking your blood pressure at home can be an important part of managing hypertension. In fact, the American Heart Association (AHA) recommends this type of monitoring to help track the effectiveness of treatment between doctor visits.

Features on home blood pressure monitors can vary widely — from simple manual models to fully automated devices that allow you to send data to your doctor's office through your phone line or Internet connection.

No matter what type of home blood pressure monitor you choose, have someone at your doctor's office check the accuracy of your device. Also, make sure you understand how to use your device properly by having your doctor, nurse or other medical provider watch you take a blood pressure reading with it. Once you begin monitoring your blood pressure at home, follow these AHA-recommended tips:

- *Stay away from stimulants.* Don't smoke, drink caffeinated beverages or exercise for at least 30 minutes before checking your blood pressure.
- *Sit still and quietly.* Sit up straight with your back supported. Keep both feet flat on the floor and your arm at heart level, supported on a table or other flat surface.
- *Take more than one measurement.* It's best to take two or three different readings every time you check your blood pressure, waiting about one minute between each reading. Your doctor also may recommend taking readings at the same time each day. If your blood pressure is well controlled, home monitoring may be needed only a few days each month. If you're making any changes in your medications or have another health problem, such as diabetes, you may need to check your blood pressure more often.
- *Keep a record.* Track all your blood pressure readings, including the date and time they were taken. Blood pressure can vary throughout the day, and readings often are higher in the morning. If you have any unusual or persistent increases in your blood pressure, tell your doctor. If a higher than normal reading is accompanied by symptoms such as a severe headache, chest pain, or numbness or tingling in your face or limbs, contact your doctor immediately or seek emergency medical care. ■

- *Heart attack or stroke.* Hypertension can cause hardening and thickening of the arteries (atherosclerosis), affecting blood flow to your heart and brain. This eventually can lead to a heart attack or stroke.
- *Aneurysm.* Increased blood pressure can cause your blood vessels to weaken and bulge, forming an aneurysm. If an aneurysm grows large enough, it can burst and cause dangerous internal bleeding or even death.
- *Heart failure.* If your blood pressure is high, your heart has to work harder than it should to circulate blood throughout your body. Over time, this can cause your heart muscle to become thicker and eventually make it too stiff or too weak to effectively pump blood.
- *Kidney damage.* Hypertension can cause blood vessels in your kidneys to thicken and narrow, which can prevent these organs from properly removing excess fluid and waste material from your blood. This loss of function can lead to end-stage kidney disease, which is fatal without dialysis or a kidney transplant.
- *Eye damage.* Added pressure on blood vessels in your eyes can result in these vessels bursting or bleeding. This may lead to vision changes or blindness.
- *Metabolic syndrome.* If you have hypertension, you're more likely to develop or have other features of metabolic syndrome. This syndrome is defined as a cluster of disorders that include increased weight around the waist, high triglycerides (a type of blood fat), low high-density lipoprotein (HDL, or "good") cholesterol, and resistance to the effects of insulin, which increases blood sugar levels. The more features you have, the greater your risk of diabetes, heart disease and stroke.
- *Dementia.* Hypertension can narrow or even block arteries that supply blood to your brain. This can lead to the development of vascular dementia — a condition characterized by memory problems, confusion, and impaired thinking, speaking and reasoning. Hypertension can also make you more likely to develop mild cognitive impairment (MCI) — an intermediate stage between the changes in understanding and memory that come with aging and the more-serious problems that are associated with Alzheimer's disease.

Getting Tested

Your blood pressure typically is checked during regular doctor appointments. If your doctor suspects

Medication Warning: What Can Raise Blood Pressure

Some medications, supplements and other substances can raise your blood pressure. Common culprits include:

- *Nonsteroidal anti-inflammatory drugs (NSAIDs).* These drugs are used to relieve pain or reduce inflammation. However, they may also cause you to retain sodium and water and can harm kidney function, both of which can raise blood pressure. If you regularly use an NSAID — such as ibuprofen (Advil, Motrin, others) or naproxen (Aleve, Naprosyn) — for headaches, arthritis pain or other reasons, talk to your doctor. He or she may recommend an alternative pain medication or suggest lifestyle changes or additional medication to control your blood pressure.
- *Decongestants in cold or allergy medications.* Decongestants narrow your blood vessels, which makes it harder for blood to flow through them. They may also make some blood pressure medications less effective. Examples include pseudoephedrine (Sudafed), phenylephrine (Sudafed PE) and oxymetazoline (Afrin, others). If you have hypertension, it's best to avoid decongestants altogether. Warnings can now be found on many cold and allergy medications. But to be safe, always check the labels or ask your doctor or pharmacist about products specifically made for people who have high blood pressure.
- *Caffeine.* The caffeine found in medications or certain beverages (such as coffee, soda and energy drinks) may temporarily increase your blood pressure. Caffeine may also boost the level of cortisol and adrenaline in your body, making your blood flow faster. There isn't enough evidence to prove that caffeine raises blood pressure long term, but some doctors suggest limiting your daily amount of caffeine to no more than 200 milligrams. That's about the amount in two 12-ounce cups of coffee.
- *Herbal supplements.* Although they're billed as "natural" and can be purchased without a prescription, herbal supplements shouldn't be taken without consulting your doctor. Some — such as bitter orange, ephedra (ma-huang), ginseng, guarana, licorice and St. John's wort — can affect your blood pressure or blood pressure medications.

Other drugs — including antidepressants, steroids and immunosuppressants — also can raise blood pressure. If you're taking one of them, you may need to have your blood pressure checked more regularly or take additional medications to keep your blood pressure under control. ■

that you have high blood pressure, however, one reading alone usually isn't enough for a diagnosis.

Instead, your doctor will likely take two or three blood pressure readings at two or more separate appointments. This is because blood pressure normally varies throughout the day.

When your blood pressure is tested, a cuff is placed around your upper arm and then inflated — usually while you're sitting down. A pressure-measuring gauge and sometimes a stethoscope are then used to take the reading.

No special preparation is necessary to have your blood pressure checked. However, you might want to wear a short-sleeved shirt or other top that allows a blood pressure cuff to fit around your arm. Also, it's best to not drink coffee or smoke any cigarettes for at least 30 minutes before the test because the caffeine or chemicals in tobacco could cause a short-term rise in your blood pressure. Having a full bladder can sometimes increase your blood pressure reading as well, so you may want to use the restroom beforehand.

Treatment goals and methods

Hypertension typically is treated with a combination of lifestyle changes and medications. Currently, the treatment goal for most adults is to reach and then maintain a blood pressure reading below 140/90 mm Hg. In adults who have diabetes or chronic kidney disease, however, the goal usually is a blood pressure below 130/80 mm Hg. Nevertheless, your doctor may set target blood pressure goals that differ from standard guidelines, depending on factors such as your age and other health conditions.

Lifestyle changes

Adopting healthy habits in your daily life can help you lower your blood pressure — whether or not you've been diagnosed with prehypertension or hypertension. Here's what you can do:

- *Follow a healthy-eating plan.* It's not necessary to deprive yourself. But you may need to eat more of some foods and less of others. The best type of diet for just about everyone puts an emphasis on

fresh fruits and vegetables, whole grains, and low-fat dairy foods and limits unhealthy fats, added sugars and sodium. One diet that combines all of these elements is called the Dietary Approaches to Stop Hypertension (DASH). (See The DASH Diet, page 7.)

- *Maintain a healthy weight.* If you're overweight or obese, reducing your weight by 7 to 10 percent can help lower your blood pressure and your risk of complications related to hypertension.
- *Engage in regular physical activity.* Try to get at least 30 minutes of moderate-intensity activity on most days of the week. This includes such activities as brisk walking, dancing, riding a bike, gardening and housecleaning. You may also want to try more-intense activities, such as jogging, swimming or playing sports. Still, it's a good idea to check with your doctor about what's best for you, especially if you've been inactive or have health issues that limit your activity.
- *Don't smoke.* Although it can be difficult to stop smoking, a number of programs and products can make the process easier. Your doctor can help you choose what might work best. If you don't smoke, try to limit your exposure to secondhand smoke.
- *Limit alcohol.* If you drink, do so only in moderation. For women, that means no more than one drink a day; for men, it's no more than two drinks a day. What's one drink? A 12-ounce beer, a 5-ounce glass of wine, 1.5 ounces of 80-proof liquor, or 1 ounce of 100-proof liquor.
- *Manage stress.* Getting regular physical activity and a good night's sleep can help relieve daily pressures. Studies have found that activities such as yoga, tai chi and meditation also can be beneficial.

Although each of these habits can be helpful on their own, they produce better results when combined. Some people even can control their blood pressure with lifestyle changes alone. However, many need to take medication as well. If your doctor prescribes medication, it's important not to view healthy habits as less important. The more you can do to maintain your overall health, the greater your chance of controlling your blood pressure and keeping complications at bay.

Medications

Blood pressure medications work in different ways. Some remove excess fluid and salt from your body to lower blood pressure. Others slow your heartbeat or relax and widen your blood vessels. Often two or more medications are used in combination. In fact, it's now common for doctors to prescribe a combination of low-dose medications rather than large doses of one single drug. However, finding the most effective combination of drugs may take some time and cooperation on your part. Medications that may be used include:

- *Diuretics.* Known sometimes as water pills, diuretics help your kidneys rid your body of excess water and salt and cause blood vessels to relax (widen). These effects reduce overall body fluid and blood pressure.

Resistant Hypertension

Sometimes, hypertension can be stubbornly resistant to the usual interventions. If you're taking at least three different types of medications in full doses and can't get your blood pressure under control, you are considered to have resistant hypertension.

Having resistant hypertension doesn't mean your situation can't get better. However, you'll need to work with your doctor to try to identify what's behind the problem.

As a first step, your doctor may evaluate whether the medications and doses you're taking to control your blood pressure are appropriate for you. This means you may have to try different combinations and doses of medication to find what will work best.

Your doctor is also likely to review any medications you're taking for other conditions as well as some of your daily habits. That's because some medications, supplements and foods can worsen hypertension or keep drugs designed to lower blood pressure from working effectively. In addition, tests may be recommended to rule out secondary causes of hypertension, such as narrowing of the arteries that carry blood to the kidneys (renal artery stenosis) and sleep apnea.

If your doctor asks you to list all of the medications you're taking — including vitamins, supplements and other nonprescription drugs — be honest. Also, let your doctor know if you haven't been taking your blood pressure medications exactly as they were prescribed. Skipping doses or letting too much time go by before refilling prescriptions can contribute to poor blood pressure control. ■

The DASH Diet

DASH, which stands for Dietary Approaches to Stop Hypertension, is a lifelong approach to eating that's designed to help treat or prevent hypertension. At its core, the diet emphasizes reducing dietary sodium and eating a variety of foods rich in nutrients such as potassium, calcium and magnesium — which can help lower blood pressure. The chart below is based on 2,000 calories a day. If you are trying to lose weight, work with your doctor or a registered dietitian to find the amount of calories and serving sizes that will work best for your needs.

Food Group	Servings	Serving Sizes	Best Options/Recommendations
Grains	6 to 8 a day	1 slice bread 1 ounce dry cereal 1/2 cup cooked cereal, rice or pasta	To get the most fiber and nutrients, look for whole-grain or whole-wheat products. This includes whole-grain bread, brown rice and whole-wheat pasta.
Vegetables	4 to 5 a day	1 cup raw leafy green vegetables 1/2 cup cut-up raw or cooked vegetables 1/2 cup vegetable juice	Tomatoes, carrots, broccoli, sweet potatoes, greens and other vegetables are full of fiber, vitamins, and minerals such as potassium and magnesium. When buying frozen or canned vegetables, choose those labeled as "low sodium" or "without added salt."
Fruits	4 to 5 a day	1 medium fruit 1/2 cup of fresh, frozen or canned fruit 1/2 cup fruit juice	Fruits such as apples, bananas, oranges, mangoes, melons, peaches and strawberries are packed with vitamins and minerals. However, be aware that certain citrus fruits and juices, such as grapefruit, can interact with certain blood pressure medications.
Dairy products	2 to 3 a day	1 cup skim milk or 1 percent milk 1 cup yogurt 1 1/2 ounces cheese	Milk, yogurt, cheese and other dairy products are major sources of calcium, vitamin D and protein. Choose products that are low-fat or fat-free. Also, go easy on cheese — it's typically high in sodium.
Lean meats, poultry and fish	6 or fewer a day	1 ounce cooked skinless poultry or seafood or lean meat 1 ounce water-packed, no-salt-added canned tuna 1 egg (limit egg yolks to no more than 4 a week)	Meat is a good source of protein, B vitamins, iron and zinc. Yet even lean varieties contain fat and cholesterol, so try cutting back your usual portions by one-third or one-half and putting more vegetables on your plate. Also, trim away skin and fat from meat and skip frying in favor of broiling, grilling, roasting or poaching.
Nuts, seeds and legumes	4 to 5 a week	1/3 cup nuts 2 tablespoons seeds 1/2 cup cooked beans or peas	Almonds, sunflower seeds, kidney beans, peas, lentils and other foods in this family are good sources of magnesium, potassium and protein. They're also full of fiber and plant compounds (phytochemicals). Still, calories count, so keep serving sizes small.
Fats and oils	2 to 3 a day	1 teaspoon margarine 1 tablespoon low-fat mayonnaise 2 tablespoons light salad dressing	Get only 30 percent or less of your daily calories from fat. Whenever possible, choose unsaturated fats, limit saturated fat (found in meat, butter, cheese and high-fat dairy products) and avoid trans fats (commonly found in processed foods that are baked or fried).
Sweets and added sugars	5 or fewer a week	1 tablespoon sugar, jelly or jam 1/2 cup sorbet 1 cup lemonade	When you eat sweets, opt for those that are fat-free or low-fat, such as sorbets, fruit ices, jelly beans, hard candy, graham crackers or low-fat cookies.

For more information, visit the National Heart, Lung, and Blood Institute at *www.nhlbi.nih.gov*. ■

- *Beta blockers.* These medications cause your heart to beat slower and with less force. Some beta blockers also cause blood vessels to relax.
- *Angiotensin-converting enzyme (ACE) inhibitors.* These medications prevent your body from making angiotensin II, a hormone that narrows blood vessels and triggers the release of aldosterone, a hormone that retains sodium and water in the body. This allows your blood vessels to relax and maintain better blood flow.
- *Angiotensin II receptor blockers.* Like ACE inhibitors, these medications help relax the blood vessels. But instead of preventing the formation of angiotensin II, they block the action of this hormone.
- *Calcium channel blockers.* These medications keep calcium from entering cells in your heart and blood vessels, allowing blood vessels to relax.
- *Renin inhibitors.* This type of medication slows down the production of renin, an enzyme produced by your kidneys that starts a chain of chemical steps that increases your blood pressure. Currently, only one renin inhibitor — known as aliskiren (Tekturna) — is used to treat hypertension.
- *Alpha blockers.* This type of medication reduces the effect of nerve impulses that narrow blood vessels, causing them to relax and widen.
- *Alpha-beta blockers.* These medications combine the effects of alpha blockers and beta blockers. They slow the heart rate as well as reduce the effect of nerve impulses that constrict the blood vessels.
- *Central nervous system inhibitors.* These medications lower blood pressure by reducing nerve impulses that increase heart rate and cause blood vessels to narrow.
- *Direct vasodilators.* These medications act directly on blood vessels to cause them to relax.

Like all medications, blood pressure drugs have potential side effects. If you develop noticeable problems after being prescribed a certain drug, talk to your doctor. He or she may be able to adjust the dose or switch you to another medication. However, don't ever stop taking any of these medications on your own. Stopping your blood pressure medications may result in a sudden and severe rebound increase in blood pressure that can have serious consequences such as heart attack or stroke.

Maintaining control

If you don't have hypertension, you can prevent it by adopting the same lifestyle measures recommended for those with the condition. If you do have hypertension, you'll need treatment — both in order to and after you get your blood pressure under control. The reason? Even though lifestyle changes and medications can effectively lower blood pressure, they can't cure hypertension. If you stop treatment, you could be putting your health at risk.

Not following certain aspects of your treatment plan also could put your health in danger. If you're on medications, for example, take these drugs exactly as they've been prescribed. If you have any questions about how to take a drug or are having trouble paying for your medications, ask your doctor or pharmacist for help. Also, be sure not to miss any scheduled medical appointments. Regular checkups allow your doctor to see how well your treatment is working, or to make changes in your treatment if needed. ■

Additional Resources

American Heart Association
www.heart.org

American Stroke Association
www.strokeassociation.org

Centers for Disease Control and Prevention
www.cdc.gov

Mayo Clinic Health Information
www.MayoClinic.com

National Heart, Lung, and Blood Institute
www.nhlbi.nih.gov

National Institute of Diabetes and Digestive and Kidney Diseases
www.niddk.nih.gov

National Institute of Neurological Disorders and Stroke
www.ninds.nih.gov ■

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