CHAPTER 1

High Blood Pressure (Hypertension)

WHAT YOU WILL LEARN IN CHAPTER 1

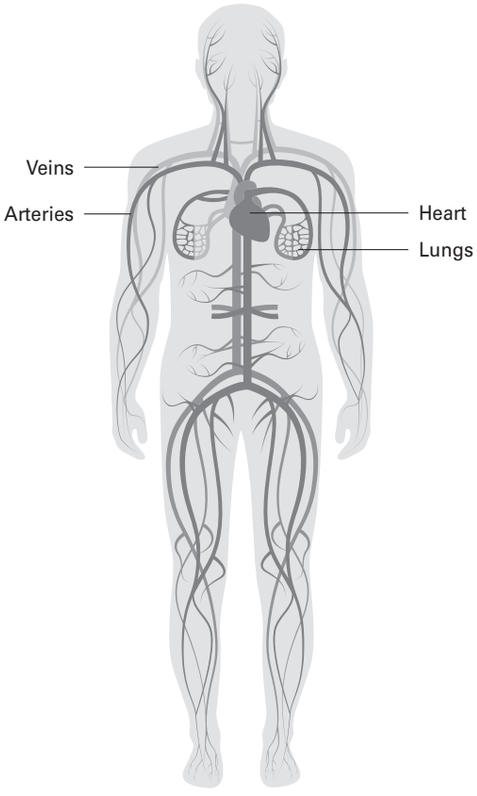
- what high blood pressure is, its risks, and its causes
- how high blood pressure is diagnosed and treated
- how high blood pressure, mental health disorders, and substance use disorders interact
- ways to prevent high blood pressure from occurring or worsening
- where to find more information

What Is High Blood Pressure?

High blood pressure, called *hypertension,* means the pressure in a person's blood vessel system is higher than normal. About one in three Americans has this condition. The U.S. Centers for Disease Control and Prevention (CDC) reports that nearly 70 million people have high blood pressure, but only half have it under control.[1] High blood pressure can be an early sign that cardiovascular disease is developing. It increases the risk of having a heart attack or stroke. Because many people with high blood pressure do not have any symptoms, it is called the "silent killer." As a preventative health measure, everyone should have their blood pressure checked each year.

FIGURE 1

Circulatory System



How Do the Heart and Blood Vessels Work?

The heart works as a pump, its muscles contracting and relaxing to circulate blood through the body (see figure 1). After blood picks up oxygen in the lungs, it goes to the heart, which pumps the oxygen-rich blood through the arteries to every part of the body. The body's cells and tissues receive oxygen and nutrients from the blood, which then returns through the veins to the lungs. In the lungs, the blood picks up oxygen again, and the cycle repeats.

Blood pressure is the force of the blood against the walls of the arteries as it flows through the body. Blood pressure is expressed as two numbers, for example, 135/70, which is spoken as "135 over 70." The higher first number is the blood pressure inside the arteries when the heart is contracting, and the lower second number is the blood pressure inside the arteries when the heart is relaxing. Normal adult blood pressure usually ranges between 80/60 and 140/80. A National Heart, Lung, and Blood Institute report indicates that adults younger than sixty should maintain blood pressure less than 140/90.[2]

Blood pressure normally rises and falls throughout the day. If it stays high for long periods, it can cause problems. If the blood vessels become stiff—which can occur from smoking, age, diabetes, high blood pressure, or high cholesterol—blood pressure goes up and the heart has to work harder to pump the blood through the system. High blood pressure, even when a person has no symptoms, can lead to serious heart disease, stroke, or kidney disease.

Why Do People Have High Blood Pressure?

Some people inherit a higher risk for high blood pressure. They are genetically prone to have heart or blood vessel disease. Men are more likely to have high blood pressure than women, and African Americans are at higher risk than other U.S. populations. As people age, their blood pressure may rise. Excess body fat, poor diet (especially excess salt in the diet), smoking tobacco, lack of physical activity, and drinking alcohol all cause changes in the body that directly contribute to hypertension. Stress, depression, and certain personality traits, such as hostility, can also contribute to having high blood pressure.

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How Does Hypertension Interact with Mental Health and Substance Use Disorders?

Studies have shown that people who have mental health or substance use disorders may be more likely to have high blood pressure for several reasons: (1) a common cause linking the conditions, (2) substance toxicity, (3) lifestyle choices, and (4) medication side effects.[3]

Common cause

A mental health disorder and a heart condition may share a common cause. For example, people with some types of mental health conditions may be prone to having high blood pressure and other types of heart problems due to common genetic risk factors.

Toxicity of substances

When taken in excess, some substances (including alcohol and cocaine) are toxic to the heart and the blood vessels. Blood pressure is often elevated during cocaine or other stimulant intoxication and during withdrawal from alcohol and sedatives. In some cases, people have died of a heart attack during cocaine or stimulant intoxication because the stimulants caused blood vessels to suddenly constrict severely. Changes in blood pressure due to intoxication or withdrawal will resolve on their own, but if clinicians find a person's blood pressure is extremely high or low, they should refer the person for medical evaluation and treatment immediately.

Drinking alcohol regularly leads to chronic high blood pressure even when the person isn't experiencing intoxication or withdrawal. When people with an alcohol use disorder stop drinking completely high blood pressure typically improves, but doctors should still monitor people in recovery because they may still need medication.

Related lifestyle choices

Some health or lifestyle habits cause high blood pressure. People with co-occurring mental health and substance use disorders may not take good care of themselves. They may not eat well, may be less active than others, may sleep less, and may be overweight. Additionally, people with co-occurring disorders might not get regular medical checkups with a primary care provider, so elevated blood pressure may go unnoticed and untreated. As part of preventative care, everyone needs to establish care with a primary care provider and have their blood pressure checked regularly.

Medication side effects

Some medications for treating mental health disorders can either elevate or lower blood pressure. Some of them can make it easier to gain weight. Others directly increase fats in the blood and blood sugar, which can contribute to hypertension

and heart disease. Many effective options are available for the treatment of mental health conditions, so doctors should consider choosing those with a lower chance of causing weight gain, elevated fat levels, and elevated blood sugars. Or, if these medications are required because they are working well to treat the mental health or substance use disorder, doctors can work with patients to prevent these side effects or to reduce them when they occur.

How Are People Screened for High Blood Pressure?

The American Heart Association and the U.S. Preventive Services Task Force recommend a blood pressure check every two years for people with blood pressure below 120/80 and every year for people with prehypertension (blood pressure between 120/80 and 139/89).[4] The American Psychiatric, Diabetes, and Obesity Associations' guidelines for monitoring people taking antipsychotic medications recommend checking weight and blood pressure prior to and three months after starting or changing medication, and then annually after that.[5] Many medical associations also recommend assessments of other cardiovascular risk factors (see table 1). These assessments should be done more often if people have additional risk factors, such as taking antipsychotic medications, being overweight, or having diabetes or known high blood pressure.

People with co-occurring disorders have a higher risk for high blood pressure and should be screened when they enroll in treatment and periodically after that. Program staff should take a family history to see whether a patient may have genetic risk factors for high blood pressure or heart disease. Staff should check patients' blood pressure and pulse on admission and regularly thereafter. People whose blood pressure is higher than 140/90 should be rechecked three times during the next week. People with persistent high blood pressure should be referred to a primary care provider for treatment. Those with blood pressure of 180/110 or higher should be treated immediately by seeking urgent care.

A blood pressure check is recommended every two years for people with blood pressure below 120/80 and every year for people with prehypertension, which is blood pressure between 120/80 and 139/89.

TABLE 1

Recommended Screening for Heart Disease

Screening	Frequency	Reason
Blood pressure	every 2 years, or more often if higher than 120/80	to assess for hypertension and prehypertension
Cholesterol	every 4 to 6 years	to assess for high cholesterol levels that could lead to blood vessel blockages
Blood glucose	every 3 years after age 45	to assess for diabetes and prediabetes
Weight and body mass index (BMI)	every healthcare visit	to assess for overweight and obesity
Waist circumference	as needed if BMI is greater than 25	to assess for abdominal obesity
Family history of cardiovascular disease	every healthcare visit	to assess for familial risk of heart disease
History of tobacco smoking, physical activity/exercise, and diet	every healthcare visit	to assess for these heart disease risk factors

Leaders of co-occurring disorders programs must decide whether they wish to conduct blood pressure screening themselves or refer patients to primary care for this. Checking blood pressure on admission to co-occurring disorder treatment programs is perhaps the better approach. Patients should also be informed of and taught about the meaning of their blood pressure numbers.

How Is High Blood Pressure Treated?

Numerous medications can reduce high blood pressure. People using these medications should meet regularly with their healthcare providers to monitor their condition. People who have high blood pressure can also do much for themselves to keep high blood pressure in check, including eating a healthy diet, exercising, staying sober, quitting smoking, practicing stress management techniques, and self-monitoring.

In addition to treating high blood pressure directly, the American Heart Association recommends that doctors treat people who have other risk factors for cardiovascular disease (see table 2).[6]

TABLE 2

Risk Factors and Recommendations for Cardiovascular Disease

Risk Factor	Recommendation
Cholesterol	Lower to less than 200 mg/dL
LDL levels	Lower to doctor-recommended range (depends on other risk factors)
HDL levels	Women: increase to more than 50 mg/dL Men: increase to more than 40 mg/dL
Triglycerides	Reduce to less than 150 mg/dL
Fasting glucose	Lower to less than 100 mg/dL
Blood pressure	Lower to 120/80 mmHg
Body mass index	Reduce to less than 25 kg/m2
Waist circumference	Women: Reduce to less than 35 inches Men: Reduce to less than 40 inches
Exercise	If moderate: increase to 30 minutes 5 days a week If vigorous: increase to 25 minutes at least 3 days a week
Smoking	Quit
Alcohol	Women: limit to 1 drink per day* Men: limit to 2 drinks per day* *If the person is not diagnosed with alcohol use disorder

Medications

Many blood pressure, or *antihypertensive,* medications can reduce high blood pressure to a normal level. These are the six main types, or classes, of blood pressure medications:

- diuretics
- angiotensin-converting enzyme inhibitors (ACE inhibitors)
- angiotensin receptor blockers (ARBs)
- beta blockers
- centrally acting agents
- vasodilators

The medication reference at the end of this chapter describes how each of these drug classes lowers blood pressure. In general, these antihypertensive medications work by either relaxing the blood vessels or lowering the blood volume. Diuretics may be slightly more effective than the other classes of medications. Research studies suggest that lowering the risk of heart attack and stroke depends not so much on the class of medication taken, but on how well the blood pressure is controlled. That is why people can try different kinds of medications and self-management strategies until they find an approach that is most effective at lowering their blood pressure.

Although treatment for high blood pressure usually starts with one medication, many people need more than one treatment or medication. It is not unusual for people with high blood pressure to require three or four different medications every day. Prescribers need to check to be sure that the selected antihypertensive medications are safe to use together and safe to use with any medications patients are taking for other conditions. The main possible side effect of antihypertensive medications is lowering the blood pressure too much. People may get dizzy and fall or faint when their blood pressure is too low.

If a doctor has prescribed medication for high blood pressure, the patient needs to take the medication each day as prescribed. People with mental health and substance use disorders may have difficulty remembering to take daily medication, or they may worry that a prescribed medication is like an illicit drug from which they should abstain. Blood pressure medications are not physically addictive. Because of the medications' effect on the heart and blood vessel system, prescribers usually taper down high doses before stopping use of these medications.

A common reason hypertension treatment does not work is that people don't take their medications. Because high blood pressure does not hurt or cause other symptoms, people may feel unmotivated to treat this condition. Making them aware of the serious consequences of high blood pressure—including heart attack, stroke, and death—can motivate them to address this condition.

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What Self-Management Steps Can People Take to Control High Blood Pressure?

People with high blood pressure can do much to take care of their condition themselves. First, they need to learn to monitor their own blood pressure. They can keep a monitor on hand at home. They should ask their provider to tell them the highest and lowest blood pressure that is safe for them. When their measurements fall outside these numbers, they should alert their providers, who may instruct them to take their medication differently or to take other actions.

In addition, doctors recommend that people with high blood pressure make changes in their lifestyle that improve blood pressure, including losing weight or maintaining a healthy weight, reducing salt and fat in their diet, increasing physical activity, quitting smoking, and managing stress.

Sobriety from alcohol and other drugs

Because alcohol and other drugs can directly cause high blood pressure and heart disease, it makes sense that stopping their use will halt their ability to damage the heart and blood vessels. Research shows that stopping alcohol and other drug use can lead to rapid improvement in blood pressure.

Exercise

If a person has high blood pressure or heart disease, his or her doctor will make recommendations about exercise or physical activity to work the body so that heart rate and breathing increase. In most cases, people with high blood pressure will benefit from daily moderate exercise. The American Heart Association recommends 30 minutes of moderate exercise five days per week or 25 minutes of vigorous exercise three days per week. Exercise has multiple benefits for people with co-occurring disorders and high blood pressure, including increasing fitness, elevating mood, reducing stress, and helping with cravings.

Diet

People with high blood pressure and other chronic health conditions should eat a diet that is high in fiber and low in fat and processed sugar. Salt has a strong effect on blood pressure. Eating a diet with low salt or no salt will lower blood pressure. A low-salt diet contains less than 2000 mg of salt (sodium chloride) per day. Reading the labels of foods is a good habit and will help people choose foods that have lower salt, fat, and sugar content. The main source of salt in the diet comes from packaged and processed foods, such as canned or bagged foods and restaurant-made foods. Buying fresh or frozen vegetables and meats and preparing food from scratch is a great step toward a healthy diet.

Other dietary factors that help reduce high blood pressure include eating more fruits and vegetables, low-fat dairy products, fiber, fish (instead of other meats), and nuts. A healthy diet also means reducing the number of lean meat, fish, and poultry servings; reducing saturated and total fat; and eating fewer sweets. Researchers have shown that these kinds of diet changes lower blood pressure. The Dietary Approaches to Stop Hypertension, or DASH, diet offers an eating plan specifically tailored for lowering blood pressure (see table 3).

TABLE 3

DASH Eating Plan Recommendations

Food	Recommendation
Fruits	4 to 5 servings a day
Vegetables	4 to 5 servings a day
Low-fat dairy products	2 to 3 servings a day
Fiber: whole grains, fiber-rich breakfast cereals	7 to 8 servings a day
Lean meats, fish, and poultry	6 or fewer 1-ounce servings a day
Nuts (e.g., unsalted almonds)	4 to 5 servings a week[7]

Stress management

Stress occurs when a person feels pressure, strain, or worry. Emotions brought about from stress help us recognize and address problems. During periods of stress, the body releases stress hormones that prepare the person to fight or flee from danger. These hormones increase heart rate and constrict blood vessels, which increases blood pressure. This reaction prepares the body to cope with danger and is vital to survival. However, if the stress hormones are turned on frequently or for long periods, they can eventually damage the cardiovascular system.

Stress management means recognizing triggers for stress and using a variety of ways to reduce the stress. Different stress-management strategies work for different people, but it is important to do things that reduce stress each day or many times each week. People can learn more about stress management at the American Heart Association website.

Quitting smoking

Quitting tobacco smoking dramatically improves a person's heart health and reduces the risk of lung disease and cancers. The smoke from cigarettes, cigars, and other

combustible products contains toxins that create inflammation within the blood cell lining and in the heart. Quitting smoking stops exposure to these smoke toxins.

Electronic cigarettes, commonly called *e-cigarettes* or *e-cigs,* deliver nicotine in a vapor rather than in tobacco smoke, so they may not expose people to smoke toxins. However, they do contain nicotine, the main addictive component of tobacco. E-cigs are relatively new products and, as of this writing, are not regulated by the Food and Drug Administration (FDA). Scientific research has not yet fully established their safety, including their effects and risks regarding blood pressure.

The nicotine in tobacco products increases heart rate and blood pressure by a small amount. Nicotine replacement therapy is proven safe to help people with heart disease to quit smoking, but should not be given to people who have had a heart attack in the past week or who have very high blood pressure. After people recover from a heart attack or have their high blood pressure treated, they can use nicotine replacement therapy safely. Quitting smoking at any age will improve the smoker's health and lengthen his or her life. Many supports are available for people trying to quit, including classes, hotlines, websites, and online support groups that can provide information about coping strategies.

Self-monitoring

As people work on managing their high blood pressure, they can check their own blood pressure periodically. If it is well-controlled, doctors suggest checking blood pressure once a week or once a month, at different times of day and after a few minutes of physical exertion. Noticing how their management efforts affect their blood pressure can help people better control their hypertension. Because losing weight has a strong impact on blood pressure, people can also check their own weight periodically—once a week at the same time of day. People who are developing an exercise routine can also monitor fitness by periodically checking their pulse after a period of exercise, for example, after 20 minutes of walking on a treadmill. As people improve their fitness, they will be able to exercise longer or more intensely to achieve the same increase in pulse.

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In summary, high blood pressure occurs in many adults. It increases the risk of having a heart attack or stroke. People can reduce their chance of having high blood pressure by maintaining a normal weight, eating a healthy diet, exercising, avoiding alcohol and other drugs, and quitting smoking. Many medications are available that can reduce blood pressure.

Where Can I Learn More?

In this guide

You can learn more about heart and blood vessel diseases and managing these cardiovascular conditions in the following chapters:

Chapter 2: Heart and Blood Vessel Disease (Cardiovascular Disease)

Chapter 3: Overweight and Obesity

Chapter 4: Smoking and Tobacco Use Disorder

Chapter 12: Wellness and Self-Management

Web and other resources

American Heart Association, www.heart.org

The AHA site includes information on high blood pressure, stress management, and quitting smoking.

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

The NHLBI's health topics include blood pressure information in both English and Spanish.

Medline Plus, www.nlm.nih.gov/medlineplus

Medline Plus offers information on blood pressure medications, plus a "Start Here" resources list and a section on the latest medical news articles.

WebMD, www.webmd.com

This site's hypertension section includes explanations of how blood pressure medications work.

Dietary Approaches to Stop Hypertension (DASH) Diet, www.nhlbi.nih.gov/health/health-topics/topics/dash-eating-plan

The Dietary Approaches to Stop Hypertension, or DASH, diet offers an eating plan specifically tailored for lowering blood pressure.

HIGH BLOOD PRESSURE MEDICATIONS REFERENCE

Angiotensin-Converting Enzyme Inhibitors (ACE Inhibitors)

The *angiotensin-converting enzyme* is a substance produced by the kidneys, a component of the system called the *renin-angiotensin-aldosterone system*, which is ultimately responsible for constricting the blood vessels and increasing blood pressure. ACE inhibitor medications reduce the body's production of the angiotensin-converting enzyme, decreasing the function of the renin-angiotensin-aldosterone system and thus helping the blood vessels remain wide open and lowering blood pressure in people with hypertension. ACE inhibitors and angiotensin II blockers help protect the heart and kidney from damage caused by high blood pressure and diabetes. During treatment with ACE inhibitors, doctors will ask patients to have their blood tested for kidney function and potassium levels. It is especially important to do so when people are taking lithium, because the interaction between ACE inhibitors and lithium may sometimes be toxic to the kidneys.

Angiotensin II Receptor Blockers (ARBs)

Medications in this class neutralize the action of the component *angiotensin II* in the renin-angiotensin-aldosterone system. ARB medications relax the blood vessels and lower blood pressure. ACE inhibitors and ARBs are used to help protect the heart and kidneys from damage caused by high blood pressure and diabetes. Both ACE inhibitors and ARB medications can interact negatively with lithium.

Renin Inhibitors

Like ACE inhibitors and ARB medications, renin inhibitors also work with the renin-angiotensin-aldosterone system, although on a different aspect of the system. They, too, can interact with lithium and patients taking both medications require additional monitoring of lithium levels and kidney function.

Calcium Channel Blockers

Medications in this drug class act on muscle cells in the walls of the blood vessels and allow the blood vessels to relax. They can sometime cause harmless swelling of the legs.

Beta Blockers

These medications reduce the speed of the heartbeat and the work of the heart, lowering blood pressure. During a stress response, the body releases adrenaline, which is one reason the heart pumps faster, the blood vessels narrow, and blood pressure increases. Beta blockers interfere with the effect of adrenaline and other stress hormones on the heart. Beta blockers may be used to treat hypertension whether stress is involved or not. They may also be used to treat some forms of anxiety, migraines, and tremors, although the evidence for their use to treat anxiety disorders is weak. Certain beta blockers can have side effects of fatigue and depression.

Alpha Antagonists

These medications are rarely used for long-term hypertension treatment. A research study showed that these medications were not as effective as other medications at preventing cardiovascular disease.[8] However, some of the medications in this class, such as prazosin and clonidine, may be used to treat excessive nightmares, opiate withdrawal symptoms, or attention-deficit/hyperactivity disorder (ADHD).

Diuretics

Diuretics reduce the salt and water in the body to control blood pressure. People who use these medications may urinate frequently and should drink enough water to avoid dehydration. Doctors will ask patients taking these medications to have the potassium levels in their blood blood checked regularly, as they sometimes may become too low or too high depending on the diuretic used. Because diuretics may interact with lithium, people prescribed both diuretics and lithium will need their lithium level monitored more closely than usual.

Vasodilators

Hydralazine is a vasodilator that relaxes the muscles in the walls of the blood vessels. As a result, the blood vessels open, or dilate, which reduces the blood pressure against the vessel walls. All the antihypertensives can cause low blood pressure, especially in people who take certain antipsychotics known to lower the blood pressure (such as clozapine).

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