American Heart Association.

Hypertension Guideline Toolkit

Nearly half of American adults have high blood pressure, but you can make a difference.

The 2017 Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults (**2017 Hypertension Clinical Practice Guideline**) has important implications for the treatment of nearly 103 million adults in the United States. As healthcare providers, you need resources to help you integrate the new guideline into your practice so you can provide optimal care for patients with elevated blood pressure (BP) or hypertension.

heart.org/bptools

CONTENTS

This toolkit offers you a variety of essential guideline-related resources:

PLUS

- Summaries of evidence-based recommendations
- Links to treatment algorithms
- Printable resources to help your patients

In Practice

Top 10 Things to Know
Download PDF

5 Things to Know

From the 2017 Hypertension Guideline that Will Impact Your Clinical Practice

From the 2017 Hypertension Clinical Practice Guideline

1 Blood pressure classifications have changed. The guideline establishes a new evidence-based classification of BP in adults, with hypertension defined by systolic and diastolic BPs that are lower than the previous thresholds.

2 The prevalence of hypertension in America is higher. Nearly half of all adults in the United States will have high BP under the updated classifications.

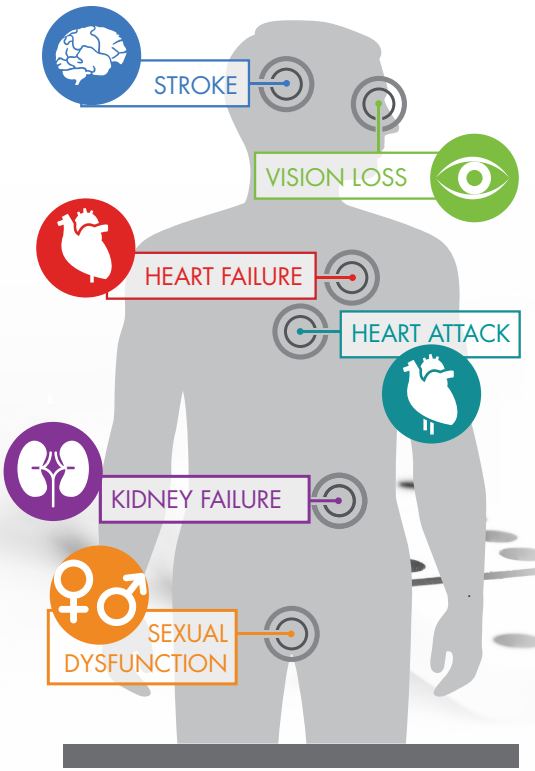
3 Treating high blood pressure begins with accurate measurements. Accurate measurement of BP is essential for categorizing BP, determining the risk of atherosclerotic cardiovascular disease and managing high BP. Diagnosis and management of hypertension should be based on accurate measurements not only in the office but also through self-monitoring.

4 Lifestyle changes are a first line of treatment for many patients. Nonpharmacologic interventions aimed at addressing poor dietary habits, physical inactivity, and/or excessive consumption of alcohol are fundamentally important in managing the underlying causes of high BP in most adults. Healthcare providers should also discuss the importance of medication management and discuss all prescription and over-the-counter medications with patients.

5 Team-based approach to improving treatment and control in adults with high blood pressure. Most adults receiving antihypertensive drug therapy have an average systolic BP and/or diastolic BP above the target level recommended in this guideline. Recommendations to improve treatment and control are provided, including a team-based approach to management.

The Domino Effect

High blood pressure is often the first domino in a chain or "domino effect" leading to devastating consequences, like:



Hypertension, the "silent killer," is associated with a variety of life-threatening diseases or conditions.

Coronary heart disease
Higher BP has been associated with an increased risk of CVD, and the rate of myocardial infarction increases as BP increases.

Stroke
Hypertension is the leading modifiable risk factor for stroke, with hypertension causing approximately half of all strokes.

Heart failure
High BP is associated with increased risk of heart failure in both men and women, and as many as 91% of patients with newly diagnosed heart failure have a history of hypertension.

Kidney disease/failure
Hypertension is the second leading cause of kidney failure, and nearly half of patients with chronic kidney disease do not have adequately controlled hypertension.

Vision loss
Long-term hypertension can harm vision in many ways, including retinopathy, choroidopathy (fluid buildup under the retina) and optic neuropathy.

In Practice

Help your patients to avoid the serious problems that can result from blood pressure being too high for too long.

Hypertension and CVD Risk Factors

The guideline recommends screening for and managing these risk factors.

Several **modifiable CVD risk factors** are commonly found in people with hypertension, including:

- **Current cigarette smoking, secondhand smoke**
- **Diabetes mellitus**
- **Dyslipidemia/hypercholesterolemia**
- **Overweight/obesity**
- **Physical inactivity/low fitness**
- **Unhealthy diet**

In addition, several **relatively fixed risk factors** associated with hypertension should be considered, including:

- Chronic kidney disease
- Family history
- Increased age
- Low socioeconomic/ educational status
- Male sex
- Obstructive sleep apnea
- Psychosocial stress

Nearly half of American adults have high blood pressure.

In Practice

Help your patients understand the risks of high BP and the substantial benefits of lowering their BP. Emphasize the central role they play in preventing and managing elevated BP.

A 10 mm Hg reduction in systolic blood pressure can significantly reduce risk of several conditions:

- **Coronary Heart Disease** — **17%** reduced risk
- **Stroke** — **27%** reduced risk
- **Heart Failure** — **28%** reduced risk

NEW Categories of Hypertension

The **new** categories reflect a more aggressive approach to managing BP, with elimination of the prehypertension category, and lowering of the threshold for hypertension to 130/80 mm Hg.

BP CATEGORY	BP (MM HG)		
	Systolic		Diastolic
NORMAL	<120	and	<80
ELEVATED	120-129	and	<80
HYPERTENSION			
Stage 1	130-139	or	80-89
Stage 2	≥140	or	≥90
HYPERTENSIVE CRISIS	>180	and/ or	>120

In Practice

Help your patients understand their BP readings. **Print this table**, circle their BP category, and give it to them along with other appropriate resources. The table is available in **English**, **Spanish** and **Traditional Chinese**.

Prevalence of Hypertension

According to the new BP threshold, hypertension (≥130/80 mm Hg) affects approximately **46% of the U.S. adult population.**

The prevalence varies according to sex, age and race-ethnicity, with the highest prevalence found among people 75 years or older, especially women, and in the non-Hispanic black population.

Patient Characteristics	BP≥130/80 mm Hg[a]	
	Men (n=4717)	Women (n=4906)
Overall Crude	46%	
Age-sex adjusted	48%	43%
Age group (yr)		
20-44	30%	19%
45-54	50%	44%
55-64	70%	63%
65-74	77%	75%
≥75	79%	85%
Race-ethnicity[b]		
Non-Hispanic white	47%	41%
Non-Hispanic black	59%	56%
Non-Hispanic Asian	45%	36%
Hispanic	44%	42%

[a]Or self-reported use of antihypertensive medication.
[b]Adjusted to the 2010 age-sex distribution of the U.S. adult population.

Prevalence of Hypertension Based on 2 SBP/DBP Thresholds
Download PDF of table with full detail

Diagnosing BP

The appropriate diagnosis of elevated BP or hypertension should involve accurate measurement of BP, self-monitoring of BP in the home, screening for white-coat hypertension or masked hypertension and for secondary causes of hypertension, and evaluating the use of BP-increasing medications and substances. In addition, BP readings from self-monitoring should be integrated into practice to confirm the diagnosis. For patients with a diagnosis of stage 1 hypertension, the ASCVD Risk Calculator should be used to estimate the patient's 10-year and lifetime risk for atherosclerotic CVD. This estimate is a factor in determining the most appropriate treatment. A team-based approach is recommended.

In Practice

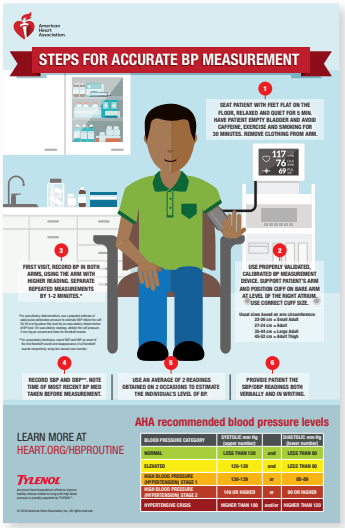
Download the ASCVD Risk Calculator or launch a web version.

Measuring BP

Accurate measurement of BP is essential to proper prevention, detection and management of BP. Errors in measuring BP can have a substantial effect on BP, with estimated changes of 2 to 50 mm Hg. Recognizing the importance of accurate measurement of BP, the 2017 guideline focuses on the standards for accurate measurement of BP.

A team-based approach to care is recommended. Such an approach has been associated with lower systolic and diastolic measurements as well as an increased proportion of people with controlled BP. Teams consisting of physicians, nurses, physician assistants and pharmacists can have the greatest impact on improving the monitoring and management of blood pressure.

The guideline describes six key steps for proper measurement of BP.



Use of the wrong size cuff is the most common error in measuring BP. The discrepancy in systolic BP can be as great as 10 mm Hg if the cuff is too small; the difference in diastolic BP can be as great as 8 mm Hg. To ensure accurate measurements, the guideline offers the following recommendations for selecting the appropriate size cuff.

Arm Circumference (cm, inches)	Usual Cuff Size
22-26 (8.5-10.2)	Small adult
27-34 (10.6-13.3)	Adult
35-44 (13.8-17.3)	Large adult
45-52 (17.7-20.5)	Adult thigh

Screening for White-Coat and Masked Hypertension
The prevalence of white-coat or masked hypertension has been approximately 10% in population-based surveys and in as many as 33% of patient registries. These conditions can have a substantial impact, with white-coat hypertension leading to overtreatment and masked hypertension to undertreatment. An important component of accurately diagnosing elevated BP or hypertension is screening for these two phenomenon.

The guideline states it is reasonable to screen for white-coat hypertension in adults with:

- **untreated systolic BP** >130 mm Hg, < 160 mm Hg
- **diastolic BP:** > 80 mm Hg, < 100 mm Hg

It is reasonable to screen for masked hypertension for adults with untreated office-measured BPs that are consistently **120-129 mm Hg (systolic)** or **75-79 mm Hg (diastolic)**

Algorithms for Detecting White-Coat or Masked Hypertension

- **Patients Not Receiving Drug Therapy**
- **Patients Receiving Drug Therapy**

Screening for Secondary Hypertension
Determining whether hypertension has a secondary cause is also a component of the appropriate diagnosis of elevated BP or hypertension. Secondary causes of hypertension are responsible for high BP in approximately 10% of patients with hypertension. The following are the most common causes of secondary hypertension with prevalence indicated in parentheses.

- Obstructive sleep apnea (25-50%)
- Renovascular disease (5-34%)
- Primary aldosteronism (8-20%)
- Drugs or alcohol such as sodium containing antacids, caffeine, nicotine, NSAIDS, oral contraceptives and others (2-4%)
- Renal parenchymal disease (1-2%)

Note: Some uncommon, but important causes of secondary hypertension include pheochromocytoma/paraganglioma, Cushing's syndrome, hypo- or hyperthyroidism, aortic coarctation and others.

See more information on secondary hypertension, clinical implications, prevalence, physical examination and screening tests.

Algorithm for Screening for Secondary Hypertension

Self-Monitoring of BP
Patient self-monitoring of BP is an important focus of the 2017 guideline. Patient training should be done under medical supervision, with focus on evaluating the device used in the home and providing **detailed instructions for proper measurement**.

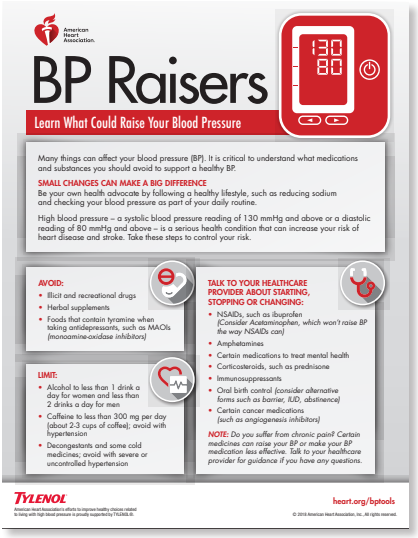
In Practice

Emphasize the importance of **monitoring BP at home** and encourage patients to use **online resources** to help ensure accurate measurements and tracking.

Identifying Medications and Substances that May Cause Elevated BP

Several medications and other substances may cause an elevated BP. Be sure to ask your patients about their use of medications, including over-the-counter medicines or other substances. Discuss how these substances may increase BP and **identify any that your patients should avoid, limit or stop to help maintain a healthy BP.**

Chronic pain affects more adults than coronary heart disease, diabetes and cancer combined. As a result, the use of pain relievers is common. Nonsteroidal anti-inflammatory drugs (NSAIDs) can increase BP because they reduce renal blood flow and cause sodium retention. Patients older than 65 years are at most risk for this effect. For patients with high blood pressure, pay extra attention when selecting medications for pain relief. Certain pain relievers can interfere with their hypertension management.



Download this infographic to help easily identify potential BP Raisers.

In Practice

Encourage your patients to talk openly about what over-the-counter medicines and substances they consider using. **Print the list of medications and substances shown above**, create an encouraging environment and start the conversation with your patients. Encourage patients with elevated BP or hypertension to consider using pain relievers other than NSAIDs.

Treating Elevated BP or Hypertension

Guideline-recommended treatment includes nonpharmacologic interventions for patients with elevated BP or stage 1 hypertension and an estimated 10-year CVD risk of less than 10%.

A combination of antihypertensive medication and nonpharmacologic interventions is recommended for patients with stage 1 hypertension and an estimated 10-year ASCVD risk of 10% or higher and for all patients with stage 2 hypertension.

In Practice

Talk to your patients about the benefits of lifestyle changes in reducing BP. Give them the **"What Can I Do To Improve My Blood Pressure"** resource as a reminder for them at home.

Nonpharmacologic Interventions

The guideline recommends several **nonpharmacologic interventions** that have been shown to reduce systolic BP by as much as 11 mm Hg in adults with hypertension. These interventions also can help prevent hypertension in adults with normal BP.

- Weight loss for patients who are overweight or obese
- Heart-healthy diet (such as DASH)
- Sodium restriction
- Potassium supplementation (preferably in dietary modification)
- Increased physical activity with structured exercise program
- Limitation of alcohol to 1 (women) or 2 (men) standard drinks per day

Antihypertensive Medication
The BP threshold for antihypertensive medication should be determined on the basis of the average BP levels and CVD risk.

BP Threshold (mm Hg)	Patient Scenario
≥130/80	ASCVD risk of 10% or higher **OR** Clinical CVD
≥140/90	ASCVD risk less than 10%

Four classes of oral antihypertensive drugs are recommended as first-line agents for the treatment of hypertension.

- Thiazide or thiazide-type diuretics
- Angiotensin-converting enzyme (ACE) inhibitors
- Angiotensin receptor blockers (ARBs)
- Calcium-channel blockers (dihydropyridines and nondihydropyridines)

Six general classes of oral antihypertensive drugs are recommended as second-line agents.

- Diuretics (loop, potassium sparing and aldosterone antagonists)
- Beta-blockers (cardioselective, and vasodilatory, noncardioselective, intrinsic sympathomimetric activity and combined alpha- and beta-receptor)
- Direct renin inhibitor
- Alpha-1 blockers
- Central alpha$_2$-agonist and other centrally acting drugs
- Direct vasodilators

Oral Antihypertensive Drugs

Simultaneous use of an ACE inhibitor, ARB and/or renin inhibitor is potentially harmful and is not recommended for the treatment of adults with hypertension.

Follow-up

Follow-up visits to reassess BP and monitor adherence and response to treatment should be regularly scheduled according to guideline recommendations. Use of self-monitoring, team-based care and telehealth strategies is recommended.

BP Status	Recommended Follow-up/Reassessment
Normal	1 year
Elevated	3-6 months
Stage 1 hypertension	Monthly until BP goal met with BP lowering medication + nonpharmacologic interventions 3-6 months after BP goal met
Stage 2 hypertension	Monthly until BP goal met with BP lowering medication + nonpharmacologic interventions 3-6 months after BP goal met

Treatment of Hypertension in Patients With Comorbidities

When setting BP thresholds and goals of pharmacologic therapy, you should consider your patients' comorbidities.

For the following comorbidities:

- Diabetes mellitus
- Chronic kidney disease
- After renal transplantation
- Heart failure
- Stable ischemic heart disease
- Peripheral artery disease

BP Threshold **≥130/80 mm Hg**
BP Goal **<130/80 mm Hg**

For secondary stroke prevention

BP Threshold **≥140/90 mm Hg**
BP Goal **<130/80 mm Hg**

The guideline also includes several recommendations for specific antihypertensive medications according to these comorbidities as well as others, such as acute intracerebral hemorrhage, atrial fibrillation, valvular heart disease and aortic disease.

Resistant Hypertension

In clinical trials, resistant hypertension has developed in approximately 20% to 35% of patients with hypertension. It is important to address resistant hypertension because of an associated increased risk of cardiovascular events. The guideline defines treatment resistance and offers recommendations for evaluating and treating patients.

Algorithm for Diagnosis, Evaluation and Treatment

The guideline recommends special attention to specific patient groups. Recommendations include:

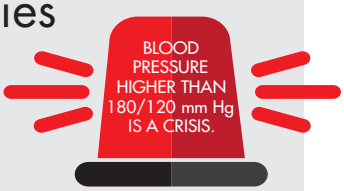
Black adults[a]
Initial antihypertensive treatment should include a thiazide-type diuretic or a calcium-channel blocker. Two or more antihypertensive medications are especially recommended to achieve a **BP target of less than 130/80 mm Hg**.

Pregnant women
Antihypertensive medication should be transitioned to methyldopa, nifedipine and/or labetalol during pregnancy. ACE inhibitors, ARBs or direct renin inhibitors should **not** be used during pregnancy.

Persons 65 years and older[b]
For patients with an average systolic BP of 130 mm Hg or higher, the **treatment goal should be a systolic BP of less than 130 mm Hg.**

For patients with hypertension and a high burden of comorbidity and limited life expectancy, clinical judgment, patient preferences and a team-based approach should be used to assess risk/benefit for decisions regarding intensity of BP lowering and choice of antihypertensive medications.

Hypertensive Crises: Emergencies and Urgencies



Hypertensive emergencies are defined as severe elevation of BP (greater than 180/120 mm Hg) associated with evidence of new or worsening target organ damage. In such cases, BP must be immediately reduced to prevent or limit further damage.

Hypertensive urgencies are defined as severe elevation of BP (greater than 180/120 mm Hg) in otherwise stable patients without acute or impending change in target organ damage or dysfunction.

The guideline provides an **algorithm for diagnosing and managing a hypertensive crisis**, as well as a list of intravenous antihypertensive drugs for treating hypertensive emergencies.

Intravenous Antihypertensive Drugs for Treatment of Hypertensive Emergencies

Read the full guidelines for instructions on persons undergoing surgical procedures.

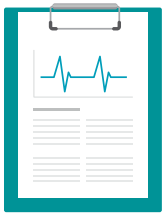
[a]*Includes adults with diabetes mellitus but not heart failure or chronic kidney disease.*
[b]*Noninstitutionalized ambulatory community-dwelling persons.*

Strategies to Improve Control of Hypertension

In addition to a team-based approach to managing hypertension, other strategies focus on promoting lifestyle modifications and improving adherence to antihypertensive medication.

Promoting lifestyle modifications
Small changes can make a big difference. Patients adopting and maintaining **lifestyle modifications** can improve their blood pressure. Encourage the use of strategies that can help promote necessary behavioral changes, such as the following:

- **Set goals**
- **Provide feedback**
- **Emphasize importance of self-monitoring**
- **Promote self-sufficiency**
- **Schedule consistent follow-up**
- **Use motivation interventions**



These strategies are most effective when combined.

Only 20%

of patients have sufficiently high adherence to antihypertensive therapy to achieve the benefits found in clinical trials.

Improving adherence to antihypertensive medication

Adherence to antihypertensive therapy is suboptimal, with only 20% of patients having sufficiently high adherence to achieve the benefits found in clinical trials. Use **strategies that have been found to be effective in improving adherence**, such as the following:

- Educate patients about hypertension, its consequences and potential side effects of medication
- Collaborate with patients to establish goals of therapy and plan of care
- Prescribe medication as once-daily dosing
- Integrate pill-taking into routine activities of daily living with support tools such as reminders, pillboxes, packaging and other aids
- Use fixed-dose combination agents when available
- Use medication adherence scales to facilitate identification of barriers
- Recognize patients for achieving treatment goals

In Practice

Consider the cultural and social contexts and health literacy of your patients. Create an encouraging, blame-free environment. Talk openly about expectations and goals. Listen to their concerns. Answer their questions.

American Heart Association.

Helpful Links and Other Resources

Here are some AHA tools and resources. They have been developed with guidance from AHA volunteers who face the same challenges as you do and are sources you can trust.

2017 Hypertension Clinical Practice Guideline

Hypertension Highlights

Target BP: BP Improvement Program

Video Series: Clinical Strategies for the 2017 Hypertension Guidelines

Patient Resources

High Blood Pressure

Blood Pressure Fact Sheets