

2017 UPDATES TO HIGH BLOOD PRESSURE CLINICAL PRACTICE GUIDELINES

Hypertension

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Definition

A. Hypertension (HTN) is considered to be a systolic blood pressure (SBP) of 130 mmHg or more, a diastolic blood pressure (DBP) of 80 mmHg or more, or describes a condition in which a person is taking antihypertensive medications. The American Heart Association and American College of Cardiology (Whelton, P. K., et al., 2017 High Blood Pressure Clinical Practice Guidelines) define HTN in adults as follows (see Table 10.6).

B. Resistant HTN is defined as:

1. BP that is not at target despite a three-drug regimen, with one of the agents being a diuretic appropriate for the patient's glomerular filtration rate (GFR).
2. BP that is controlled while taking four or more medications is also considered resistant HTN.

C. Standing and supine BPs should be measured before the initiation of combination antihypertensive therapy. Orthostatic (postural) hypotension is diagnosed when, within 2 to 5 minutes of quiet standing, one or more of the following is present:

1. At least a 20 mmHg fall in systolic pressure
2. At least a 10 mmHg fall in diastolic pressure
3. Symptoms of cerebral hypoperfusion, such as dizziness

D. The average nocturnal BP is approximately 15% lower than daytime values. Failure of the BP to fall by at least 10% during sleep is called "nondipping" and is a stronger predictor of adverse cardiovascular outcomes than daytime BP.

E. *Isolated systolic HTN (ISH)* is when the SBP is greater than or equal to 130 with DBP normal or below normal (<80 mmHg). ISH usually affects the elderly, increasing their risk of stroke or myocardial infarction (MI).

F. *Isolated diastolic hypertension (IDH)* is defined as a diastolic pressure greater than or equal to 80 mmHg with a systolic pressure less than 130 mmHg. IDH is more common in younger men who are overweight/obese and in individuals younger than 40 years.

TABLE 10.6 Whelton 2017 High Blood Pressure Clinical Practice Guideline

Blood Pressure Classification	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
Normal	<120	and <80
Elevated BP	120–129	>80
Stage 1 HTN	130–139	80–89
Stage 2 HTN	≥140	or ≥90

BP, blood pressure; HTN, hypertension.

Source: Whelton P. K., et al. (2017). High Blood Pressure Clinical Practice Guideline. A guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. *Hypertension*, DOI: 2017; HYP.0000000000000065.

G. Malignant HTN is marked HTN with retinal hemorrhages, exudates, or papilledema. Malignant HTN is usually associated with diastolic pressures above 120 mmHg.

Incidence

- A.** Worldwide, HTN affects about 975 million people.
- B.** Approximately 77.9 million or one in three adults in the United States has HTN.
- C.** The incidence of resistant HTN is being studied more closely and the current average rate is about 12% of all patients with hypertension.
- D.** The 2009 overall death rate from high BP was 18.5 per 100,000. Death rates were:
- 17.0 for White males
 - 14.4 for White females
 - 51.6 for Black males
 - 38.3 for Black females

Pathogenesis

More than 90% of cases have no identifiable cause, thus constituting the category of primary or essential HTN. The remaining 10% of cases have the following secondary causes:

- A.** Renal causes
1. Glomerulonephritis
 2. Pyelonephritis
 3. Polycystic kidney disease
- B.** Endocrine causes
1. Primary hyperaldosteronism
 2. Pheochromocytoma
 3. Hyperthyroidism
 4. Cushing's syndrome
- C.** Vascular causes
1. Coarctation of aorta
 2. Renal artery stenosis
- D.** Chemical/medication induced
1. Oral contraceptives
 2. Nonsteroidal anti-inflammatory drugs (NSAIDs)
 3. Decongestants
 4. Antidepressants
 5. Sympathomimetics
 6. Corticosteroids
 7. Lithium
 8. Ergotamine alkaloids
 9. Cyclosporine
 10. Monoamine oxidase inhibitors (MAOIs), in combination with certain drugs or foods
 11. Appetite suppressants, in combination with certain drugs or foods
 12. Cocaine
 13. Amphetamines
- E.** Obstructive sleep apnea (OSA)

Predisposing Factors

When making a diagnosis, consider not only the absolute BP reading, but also the presence or absence of other cardiovascular risk factors. Factors include the following:

- A.** Family history of HTN
- B.** Obesity

TABLE 10.8 Whelton 2017 High Blood Pressure Clinical Practice Guideline

Ethnicity/ Population	Age (Years)	Begin Initiation of Pharmacological Treatment to Lower BP	BP Goals for Treatment	Other Comments
General population	≥60	Initiate therapy for SBP ≥130 mmHg OR DBP ≥80 mmHg	Treat to goal of SBP <130 mmHg and DBP <80 mmHg	If pharmacological treatment results in a lower achieved SBP and treatment is well tolerated, treatment does not need to be adjusted.
	<60	Initiate therapy to lower BP at SBP ≥130 mmHg	Treat to goal of SBP <130 mmHg	
		Initiate therapy to lower BP at DBP ≥80 mmHg	Treat to goal of DBP <80 mmHg	
Patients with chronic kidney disease	≥18	Initiate therapy to lower the SBP ≥130 mmHg OR DBP ≥80 mmHg	Treat to goal of SBP <130 mmHg and DBP <80 mmHg	
Patients with chronic kidney disease (regard- less of race or diabetes status)	≥18			Initial or add-on antihyperten- sive therapy should include an ACEI or ARB to improve kidney outcomes.
Patients with diabetes	≥18	Initiate therapy to lower BP at SBP ≥130 mmHg OR DBP ≥80 mmHg	Treat to goal of SBP <130 mmHg and DBP <80 mmHg	The American Diabetes Association criteria differ from all else in that their guidelines remain treating toward a SBP goal of <140 mmHg and to a DBP of <80 mmHg.
General non-Black population, including those with diabetes				Initial antihypertensive therapy should include a thiazide- type diuretic, CCB, ACEI, or ARB.
General Black popu- lation, includ- ing those with diabetes				Initial antihypertensive therapy should include a thiazide- type diuretic or CCB.

ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; BP, blood pressure; CCB, calcium channel blocker; DBP, diastolic blood pressure; SBP, systolic blood pressure.

Source: Whelton P. K., et al. ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/MNA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults' *Hypertension*, DOI: 2017; HYP.0000000000000065. Retrieved Nov 2017.

TABLE 10.9 AHA, ACC, and CDC 2013 Suggested Hypertensive Medications by Medical Condition

Medical Condition	BB	ACEI or ARB	ALDO ANTAG	Thiazide	CCB
Coronary artery disease/post MI	X	X			
Systolic heart failure	X	X	X	X	
Diastolic heart failure	X	X		X	
Diabetes	X	X		X	X
Kidney disease		X			
Stroke or TIA		ACEI		X	

ACC, American College of Cardiology; ACEI, angiotensin-converting-enzyme inhibitor; AHA, American Heart Association; ALDO ANTAG, aldosterone antagonist; ARB, angiotensin II blocker; BB, beta-blocker; CCB, calcium channel blocker; CDC, Centers for Disease Control and Prevention; MI, myocardial infarction; TIA, transient ischemic attack.

TABLE 20.2 Diabetes Medication/Class (continued)

Drug	Brand Name	Drug Class
dapagliflozin	Farxiga	SGLT2 Inh SGLT2 Inh with DPP-4 Inh
empagliflozin + linagliptin	Glyxambi	SGCT2 Inh + DPP-4 Inh
canagliflozin + metformin	Invokamet	SGLT2 Inh + biguanide
canagliflozin	Invokana	SGCT2 Inh
empagliflozin	Jardiance	SGCT2 Inh
alogliptin + metformin	Kazano	DPP-4 Inh + biguanide
saxagliptin + metformin	Kombiglyze XR	DPP-4 inhibitor + biguanide
empagliflozin + linagliptin	Synjardy	SGCT2 Inh + biguanide
albiglutide	Tanzeum	GLP-1
insulin glargine	Toujeo	Long-acting (basal) insulin
insulin degludec	Tresiba	Long-acting (basal) insulin
dulaglutide	Trulicity	GLP-1
dapagliflozin	Xigduo XR Afrezza	SGLT2 Inh + biguanide Insulin for oral inhalation

DPP-4 Inh, dipeptidyl peptidase-4 inhibitor; GLP-1, glucagon-like peptide-1; N/A, not available; NPH, neutral protamine Hagedorn; SGLT2 Inh, sodium-glucose co-transporter 2 inhibitor.

treatment of cholesterol in people with DM and LDL-C of 70 to 189 mg/dL. These include:

- a. Moderate-intensity statin therapy initiated or continued for adults with DM 40 to 75 years of age.
- b. High-intensity statin therapy is reasonable for adults with DM 40 to 75 years of age with a greater than or equal to 7.5% estimated 10-year ASCVD risk unless contraindicated. (Use the lifetime risk calculator to define percentage of risk.)
- c. In adults with DM who are younger than 40 years or older than 75 years of age, it is reasonable to evaluate the potential for ASCVD benefits and for adverse effects, for drug–drug interactions, and to consider patient preferences when deciding to initiate, continue, or intensify statin therapy.

Follow-Up

- A. Determine follow-up appointments by the type of diabetes, age, patient compliance, any treatment changes, and presence of any complications related to diabetes or other health problems.
- B. A glycosylated hemoglobin determination every 3 months can assist the provider in measuring the control. There are several computer software packages that print the glucometer readings for assessing the compliance; this can be done by the provider or the patient.

- C. The American Diabetes Association management goals
 1. Preprandial glucose 80 to 120 mg/dL
 2. A glucose level of less than 180 mg/dL 1 to 2 hours after meals
 3. A bedtime glucose level of 100 to 140 mg/dL
 4. Hemoglobin A_{1c} (HgbA_{1c}) less than 7% or 7.5% in elderly
 5. In 2013, the American Diabetes Association recommended the BP goal for diabetics with hypertension should be treated to a systolic blood pressure (SBP) goal of less than 140 mmHg and to a diastolic blood pressure (DBP) of less than 80 mmHg. The 2017 Whelton P. K. et al. High Blood Pressure Clinical Practice Guideline recommends that in the diabetic population older than 18 years, pharmacological treatment should be initiated at a SBP greater than 130 mmHg or a DBP greater than 80 mmHg and treated to a goal of SBP less than 130 mmHg and a goal of DBP less than 80 mmHg. Whelton P. K. (2017) has the same recommendation for initiation of BP medication and treatment goals for patients older than 18 years of age with chronic kidney disease.
 6. Other goals are cholesterol less than 200 mg/dL, triglycerides less than 150 mg/dL, HDLs greater than 35 mg/dL, and LDLs less than 100 mg/dL and less than 70 mg/dL if heart disease is present.
- D. Annual tests or examinations should include a dilated fundoscopic examination by an ophthalmologist, to screen for retinopathy every 2 years, an annual EKG, monofilament