



Prevention and Management of Systemic Hypertension

Diagnosis and Measurement of Blood Pressure for Adults (18 years and older) (Source: NHLBI, 2004)

Blood Pressure Classification	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
Normal	<120	and <80
Prehypertension	120-139	or 80-89
Stage 1 Hypertension	140-159	or 90-99
Stage 2 Hypertension	>160	or >100

Method	Notes
<i>In-office</i>	Two readings sitting in chair. Confirm elevated reading in contralateral arm.
<i>Ambulatory BP Monitoring</i>	Indicated for evaluation of “white coat hypertension”. Absence of 10-20 percent BP decrease during sleep may indicate increased CVD risk.
<i>Patient self-check</i>	Provides information on response to therapy. May help improve adherence to therapy and is useful for evaluating “white coat hypertension”.

Patients should have a history and physical examination, including:

- Measurement of BP (with appropriate size cuff) with verification in the contralateral arm
- Examination of the optic fundi, if indicated
- Calculation of body mass index (BMI) (measurement of waist circumference also may be useful)
- Auscultation for carotid, abdominal, and femoral bruits
- Palpation of the thyroid gland
- Thorough examination of the heart and lungs
- Examination of the abdomen for enlarged kidneys, masses, and abnormal aortic pulsation
- Palpation of the lower extremities for edema and pulses
- Neurological assessment for signs of previous stroke
- Electrocardiogram, if indicated

Prior to initiating therapy, providers should also assess:

- Laboratory values including urinalysis, liver function tests, fasting blood glucose and hematocrit, serum potassium, BUN, creatinine, calcium, and a lipid profile (after a 9 to 12 hour fast). (Urinary albumin excretion / creatinine ratio is optional).
- Echocardiography in some patients to diagnose left ventricular hypertrophy or to quantify the EF in patients with suspected Heart Failure.

Assessment of Risk Factors or Identifiable Causes of Hypertension

The United States Preventive Services Task Force (USPSTF) (2007) recommends screening for high blood pressure in adults aged 18 and older (Grade A Recommendation).

Major cardiovascular risk factors include:

- Obesity (body mass index > 30 kg/m²)
- Dyslipidemia
- Diabetes mellitus
- Tobacco use or exposure
- Illicit drug use
- Physical inactivity
- Microalbuminuria, estimated glomerular filtration rate <60 mL/min
- Age (>55 for men, >65 for women)
- Family history of premature cardiovascular disease (men age <55, women age <65)

In addition, evaluation should be conducted for presence of target organ damage:

- Heart
 - Left ventricular hypertrophy
 - Angina or prior myocardial infarction
 - Prior coronary revascularization
 - Heart failure
- Brain
 - Stroke or transient ischemic attack
- Chronic kidney disease
- Peripheral arterial disease
- Retinopathy

Other identifiable causes of hypertension include:

- Drug induced or related causes
- Chronic kidney disease
- Primary aldosteronism
- Cushing’s syndrome or chronic steroid therapy
- Pheochromocytoma
- Sleep apnea
- Renovascular disease
- Coarctation of aorta
- Thyroid or parathyroid disease

Goals of Therapy and Principles of Treatment (Source: NHLBI, 2004)

The ultimate goal of antihypertensive therapy is to reduce cardiovascular and renal morbidity and mortality. Since most persons with hypertension, especially those >50 years of age, will reach the diastolic blood (DBP) pressure goal once the systolic blood pressure (SBP) goal is achieved, the primary focus should be on attaining the SBP goal. Treating SBP and DBP to targets that are 140/90 mmHg is associated with a decrease in CVD complications. In patients with hypertension and diabetes or renal disease, the blood pressure goal is < 130/80 mmHg.

Principles of hypertension treatment include:

- Treat to a BP <140/90 mmHg or BP <130/80 mmHg in patients with diabetes or chronic kidney disease.
- Majority of patients will require two medications to reach goal.
- Low dose Aspirin therapy should be considered ONLY when BP is controlled due to the risk of hemorrhagic stroke in patients with uncontrolled hypertension.

Lifestyle modifications are also necessary in treating hypertension. The following chart offers recommendations and the expected reduction a patient may see from the corresponding modification:

Modification	Recommendation	SBP Reduction
Weight reduction	Maintain normal body weight (BMI 18.5-24.9-24.9 24.9 kg/m ²)	5-20 mmHg/10kg
Adopt DASH eating plan	Consume a diet rich in fruits, vegetables, and low fat dairy products with reduced content of saturated and total fat.	8-14 mmHg
Dietary sodium reduction	Reduce dietary sodium intake to ≤ 100 mmol per day (2.4 g sodium or 6 g sodium chloride)	2-8 mmHg
Physical activity	Regular aerobic physical activity (e.g., brisk walking) at least 30 minutes per day, most days of the week	4-9 mmHg
Moderation of alcohol intake	Men: limit to ≤ 2 drinks* per day. Women and lighter weight persons: limit to ≤ 1 drink* per day.	2-4 mmHg

1 drink = ½ oz. or 15 mil ethanol (e.g., 12 oz beer, 5 oz wine, 1.5 oz 80-proof whiskey)

Pharmacologic Treatment and Indications for Individual Drug Classes (Source: NHLBI, 2004)

Classes of Antihypertensive Drugs

- Diuretics
- Alpha Blockers/Inhibitors
- Beta Blockers
- ACE Inhibitors
- Angiotensin II Receptor Blockers (Use ACE Inhibitors First)
- Calcium Channel Blocking Agents
- Vasodilators
- Monotherapy. Start with one drug that is long acting, at a low dose, administered once daily (when feasible).
- Diuretics preferred for isolated systolic hypertension (older person). Long acting diphhydropyridine calcium antagonists.

After drug therapy is initiated, patients should be monitored and medications should be adjusted accordingly:

- *Monthly:* Until BP goal is reached
- *Every 3-6 months:* After BP goal is reached and stable
- *Once or twice per year:* Serum potassium and creatinine level

References:

American Society of Hypertension

National Heart Lung and Blood Institute. (2004). Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7).

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