
**Evaluation**

**Classification of Blood Pressure (BP)***

<table>
<thead>
<tr>
<th>Category</th>
<th>SBP (mmHg)</th>
<th>DBP (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>80-89</td>
</tr>
<tr>
<td>Hypertension, Stage 1</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Hypertension, Stage 2</td>
<td>≥160</td>
<td>≥100</td>
</tr>
</tbody>
</table>

*See Blood Pressure Measurement Techniques (reverse side)
Key: SBP = systolic blood pressure, DBP = diastolic blood pressure

**Diagnostic Workup of Hypertension**

- Assess risk factors and comorbidities.
- Reveal identifiable causes of hypertension.
- Assess presence of target organ damage.
- Conduct history and physical examination.
- Obtain laboratory tests: urinalysis, blood glucose, hematocrit and lipid panel, serum potassium, creatinine, and calcium. Optional: urinary albumin/creatinine ratio.
- Obtain electrocardiogram.

**Assess for Major Cardiovascular Disease (CVD) Risk Factors**

- Hypertension
- Obesity (body mass index ≥30 kg/m²)
- Dyslipidemia
- Diabetes mellitus
- Cigarette smoking
- Physical inactivity
- Microalbuminuria, estimated glomerular filtration rate <60 mL/min
- Age (>55 for men, >65 for women)
- Family history of premature CVD (men age <55, women age ≤65)

**Assess for Identifiable Causes of Hypertension**

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

**Treatment**

**Principles of Hypertension Treatment**

- Treat to SBP <140/90 mmHg or DBP <90/60 mmHg in patients with diabetes or chronic kidney disease.
- Majority of patients will require two medications to reach goal.

**Algorithm for Treatment of Hypertension**

**Lifestyle Modifications**

- Not at Goal Blood Pressure (<140/90 mmHg)
- See Strategies for Improving Adherence to Therapy

**Initial Drug Choices**

**Without Compelling Indications**

- Stage 1 Hypertension (SBP 140-159 or DBP 90-99 mmHg)
- Thiazide-type diuretics for most. May consider ACEI, ARB, BB, CCB, or combination.

**With Compelling Indications**

- Stage 2 Hypertension (SBP ≥160 or DBP ≥100 mmHg)
- 2-drug combination for most (usually thiazide-type diuretic and ACEI, ARB, or BB, or CCB).
- Drug(s) for the compelling indications
- See Compelling Indications for Individual Drug Classes
  - Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.

**Not at Goal Blood Pressure**

- Optimize dosages or add additional drugs until goal blood pressure is achieved. Consider consultation with hypertension specialist.
- See Strategies for Improving Adherence to Therapy
### Blood Pressure Measurement Techniques

<table>
<thead>
<tr>
<th>Method</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-office</td>
<td>Two readings, 5 minutes apart, sitting in chair. Confirm elevated reading in contralateral arm.</td>
</tr>
<tr>
<td>Ambulatory BP monitoring</td>
<td>Indicated for evaluation of “white coat hypertension.” Absence of 10-20 percent BP decrease during sleep may indicate increased CVD risk.</td>
</tr>
<tr>
<td>Patient self-check</td>
<td>Provides information on response to therapy. May help improve adherence to therapy and is useful for evaluating “white coat hypertension.”</td>
</tr>
</tbody>
</table>

### Causes of Resistant Hypertension
- Improper BP measurement
- Excess sodium intake
- Inadequate diuretic therapy
- Medication
  - Inadequate doses
  - Drug actions and interactions (e.g., nonsteroidal anti-inflammatory drugs (NSAIDs), illicit drugs, sympathomimetics, oral contraceptives)
  - Over-the-counter (OTC) drugs and herbal supplements
- Excess alcohol intake
- Identifiable causes of hypertension (see reverse side)

### Compelling Indications for Individual Drug Classes

#### Compelling Indication

<table>
<thead>
<tr>
<th>Compelling Indication</th>
<th>Initial Therapy Options</th>
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</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td>THIAZ, BB, ACEI, ARB, ALDO ANT</td>
</tr>
<tr>
<td>Post myocardial infarction</td>
<td>BB, ACEI, ALDO ANT</td>
</tr>
<tr>
<td>High CVD risk</td>
<td>THIAZ, BB, ACEI, CCB</td>
</tr>
<tr>
<td>Diabetes</td>
<td>THIAZ, BB, ACEI, ARB, CCB</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>ACEI, ARB</td>
</tr>
<tr>
<td>Recurrent stroke prevention</td>
<td>THIAZ, ACEI</td>
</tr>
</tbody>
</table>

Key: THIAZ = thiazide diuretic, ACEI = angiotensin converting enzyme inhibitor, ARB = angiotensin receptor blocker, BB = beta blocker, CCB = calcium channel blocker, ALDO ANT = aldosterone antagonist

### Principles of Lifestyle Modification
- Encourage healthy lifestyles for all individuals.
- Prescribe lifestyle modifications for all patients with prehypertension and hypertension.
- Components of lifestyle modifications include weight reduction, DASH eating plan, dietary sodium reduction, aerobic physical activity, and moderation of alcohol consumption.

### Lifestyle Modification Recommendations

| Modification                  | Recommendation                                                                 | Avg. SBP Reduction Range
<table>
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<tr>
<td>Weight reduction</td>
<td>Maintain normal body weight (body mass index 18.5–24.9 kg/m²).</td>
<td>5–20 mmHg /10 kg</td>
</tr>
<tr>
<td>DASH eating plan</td>
<td>Adopt a diet rich in fruits, vegetables, and lowfat dairy products with reduced content of saturated and total fat.</td>
<td>8–14 mmHg</td>
</tr>
<tr>
<td>Dietary sodium reduction</td>
<td>Reduce dietary sodium intake to ≤100 mmol per day (2.4 g sodium or 6 g sodium chloride).</td>
<td>2–8 mmHg</td>
</tr>
<tr>
<td>Aerobic physical activity</td>
<td>Regular aerobic physical activity (e.g., brisk walking) at least 30 minutes per day, most days of the week.</td>
<td>4–9 mmHg</td>
</tr>
<tr>
<td>Moderation of alcohol consumption</td>
<td>Men: limit to ≤2 drinks* per day. Women and lighter weight persons: limit to ≤1 drink* per day.</td>
<td>2–4 mmHg</td>
</tr>
</tbody>
</table>

* 1 drink = 1/2 oz or 15 mL ethanol (e.g., 12 oz beer, 5 oz wine, 1.5 oz 80-proof whiskey).
† Effects are dose and time dependent.

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**U.S. Department of Health and Human Services**
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National High Blood Pressure Education Program

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