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>

Key: SBP = systolic blood pressure  DBP = diastolic blood pressure

BP 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 opposite arm. Practical points: Use device appropriate to arm size; no talking during measurement; arm should be resting, not suspended.</td>
</tr>
<tr>
<td>Ambulatory BP monitoring</td>
<td>Indicated for evaluation of “white coat hypertension.” Absence of 10% to 20% 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>

Major CVD Risk Factors

- Hypertension
- Obesity (BMI ≥ 30 kg/m²)
- Dyslipidemia
- Diabetes mellitus
- Cigarette smoking
- Physical inactivity
- Microalbuminuria/estimated GFR <60 mL/min
- Older age (men: >55; women: >65)
- Family history of premature CVD (men: <55; women: <65)

Identifiable Causes of Hypertension

- Sleep apnea
- Medication- and drug-related
  (see Causes of Resistant Hypertension page 3)
- Chronic kidney disease
- Primary aldosteronism
- Renovascular disease
- Cushing’s syndrome or steroid therapy
- Pheochromocytoma
- Coarctation of aorta
- Thyroid/parathyroid disease

Diagnostic Workup

- Assess:
  - Risk factors
  - Comorbidities
  - Identifiable causes of hypertension (see below)
  - Target organ damage
- Conduct history and physical examination
- Obtain lab results:
  - Urinalysis; blood glucose, hematocrit, lipids; serum potassium, creatinine, calcium; urinary albumin/creatinine ratio (optional)
- Obtain ECG

TREATMENT OF HIGH BLOOD PRESSURE

Treatment Principles

- Goal of treatment is to reduce CVD and renal morbidity and mortality
- BP goal is <140/90 mmHg; <130/80 in patients with diabetes or chronic kidney disease
- SBP is focus in patients ≥50 years of age
- Healthy lifestyle is critical to prevent and manage hypertension; specific lifestyle changes are essential for all patients with prehypertension and hypertension
- Most patients will require at least 2 medications to reach BP goal

Algorithm for Treatment of Hypertension

Lifestyle Modifications

See Lifestyle Modification Recommendations on back

Initial Medication Choices

See Compelling Indications for Medication Classes on back

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. |
| Stage 2 Hypertension (SBP ≥160 or DBP ≥100 mmHg): 2-drug combination for most (usually thiazide-type diuretic and ACEI, ARB, BB, or CCB). |

With Compelling Indications

Medication(s) for the compelling indications - See Compelling Indications for Medication Classes on back

Other antihypertensive medications (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 Treatment Adherence on back

Causes of Resistant Hypertension

- Improper BP measurement
  See BP Measurement Techniques page 2
- Excess sodium intake
- Inadequate diuretic therapy
- Excess alcohol intake
- Identifiable causes (See page 2)
- Medications/drugs
  - Inadequate doses
  - Drug actions/interactions (eg, NSAIDs, illicit drugs, sympathomimetics, OCs)
  - OTC drugs, herbal supplements

See Strategies for Improving Treatment Adherence on back
TREATMENT OF HIGH BLOOD PRESSURE (continued)\(^1,2\)

### Compelling Indications for Medication Classes

<table>
<thead>
<tr>
<th>Compelling Indication</th>
<th>Initial Therapy Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diuretic</td>
</tr>
<tr>
<td>Heart failure</td>
<td>*</td>
</tr>
<tr>
<td>Post-myocardial infarction</td>
<td>*</td>
</tr>
<tr>
<td>High CVD risk</td>
<td>*</td>
</tr>
<tr>
<td>Diabetes</td>
<td>*</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td></td>
</tr>
<tr>
<td>Recurrent stroke prevention</td>
<td>*</td>
</tr>
</tbody>
</table>

Key:
- \(\text{ACEI} = \) angiotensin-converting enzyme inhibitor
- \(\text{ARB} = \) angiotensin receptor blocker
- \(\text{CCB} = \) calcium channel blocker
- \(\text{ALDO ANT} = \) aldosterone antagonist
- \(\text{BB} = \) beta blocker

### Lifestyle Modification Recommendations

<table>
<thead>
<tr>
<th>Modification</th>
<th>Recommendations</th>
<th>Avg. SBP Reduction (mmHg)*</th>
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</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Maintain normal body weight (BMI 18.5–24.9 kg/m(^2)).</td>
<td>5–20/10 kg</td>
</tr>
<tr>
<td>DASH eating plan</td>
<td>Eat a diet rich in fruits, vegetables, and low-fat dairy products; reduce saturated and total fat.</td>
<td>8–14</td>
</tr>
<tr>
<td>Sodium reduction</td>
<td>Reduce dietary sodium intake to &lt;2.4 g (6 g sodium chloride) per day.</td>
<td>2–8</td>
</tr>
<tr>
<td>Aerobic exercise</td>
<td>Get ~30 min of regular aerobic physical activity, most days of the week.</td>
<td>4–9</td>
</tr>
<tr>
<td>Moderation of alcohol consumption</td>
<td>Men: limit to ≤2 drinks/day. Women and lighter-weight persons: limit to ≤1 drink/day. (1 drink=12 oz beer; 1.5 oz 80 proof whiskey).</td>
<td>2–4</td>
</tr>
</tbody>
</table>

*Effects are dose- and time-dependent.

### Strategies for Improving Treatment Adherence

- Provide empathy and reinforcement
- Individualize treatment and involve patients in decision making
- Consider patients' cultural beliefs and individual attitudes in formulating therapy
- Develop systems to monitor adherence to appointments and therapy
- Provide written information and records of BP readings
- Involve family and other support systems

**References:**