Hypertension in Diverse Populations: Overview of Key Messages for Clinical Practice

Key Message 1: The goal blood pressure should be < 140/90 mmHg in most patients with hypertension.¹⁻⁴⁻⁵

Definition of Hypertension

- Normal blood pressure: systolic < 120 mmHg and diastolic < 80 mmHg
- Prehypertension: systolic 120 to 139 mmHg or diastolic 80 to 89 mmHg
- Hypertension:
  - Stage 1: systolic 140 to 159 mmHg or diastolic 90 to 99 mmHg
  - Stage 2: systolic ≥ 160 mmHg or diastolic ≥ 100 mmHg
- Diagnosis of hypertension should be confirmed at an additional patient visit, usually 1 to 4 weeks after the first measurement.²

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Standard BP goal (no co-morbidities)</th>
<th>BP goals with co-morbidities</th>
</tr>
</thead>
<tbody>
<tr>
<td>JNC 8² 2013</td>
<td>&lt; 140/90 mmHg</td>
<td>&lt; 150/90 mmHg if ≥ 60 years of age</td>
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<tr>
<td></td>
<td></td>
<td>&lt; 140/90 mmHg if co-existing diabetes or CKD</td>
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<tr>
<td>ASH/ISH 4⁴ 2014</td>
<td>&lt; 140/90 mmHg</td>
<td>&lt; 140/90 mmHg if co-existing diabetes</td>
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<td></td>
<td></td>
<td>&lt; 130/80 mmHg if co-existing CKD with presence of albuminuria</td>
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<tr>
<td></td>
<td></td>
<td>&lt; 150/90 mmHg if age ≥ 80</td>
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<tr>
<td>AHA/ACC/CDC 1⁴ 2014</td>
<td>&lt; 140/90 mmHg</td>
<td>Lower BP targets may be appropriate for African Americans, the elderly or patients with LV hypertrophy, systolic or diastolic LV dysfunction, diabetes or CKD</td>
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<tr>
<td>ESH/ESC 3³ 2013</td>
<td>&lt; 140/90 mmHg</td>
<td>&lt; 140/85 mmHg if co-existing diabetes</td>
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<tr>
<td></td>
<td></td>
<td>&lt; 140/90 mmHg if co-existing CKD (diabetic or non-diabetic related)</td>
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<td>&lt; 130/90 mmHg if co-existing CKD + proteinuria</td>
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<td></td>
<td></td>
<td>&lt; 140-150/90 mmHg if age ≥ 80</td>
</tr>
<tr>
<td>ISHIB 6⁵ 2010</td>
<td>&lt; 135/85 mmHg</td>
<td>&lt; 130/80 mmHg with co-existing radiographic or lab evidence of heart or kidney abnormalities; metabolic syndrome, diabetes, documented cardiovascular damage (such as HF, PAD, stroke, or TIA); or prior cardiovascular event</td>
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</tbody>
</table>

Note: JNC 8 guidelines have not been endorsed by the National Heart, Lung and Blood Institute (NHLBI), AHA or the ACC.

ACC, American College of Cardiology; AHA, American Heart Association; ASH, American Society of Hypertension; BP, blood pressure; CDC, Centers for Disease Control and Prevention; CKD, chronic kidney disease; ESC, European Society of Cardiology; ESH, European Society of Hypertension; HF, heart failure; ISH, International Society of Hypertension; ISHIB, International Society on Hypertension in Blacks; JNC8, Report of the Eight Joint National Committee on the Prevention, Detection, Evaluation, and treatment of high blood pressure; LV, left ventricular; PAD, peripheral arterial disease; TIA, transient ischemic attack.

- A Cochrane review investigated whether lower blood pressure targets (< 135/85 mmHg) are better than standard blood pressure targets (< 140/90 mmHg) in patients without hypertension-associated co-morbidities.²
  - Conclusion: Although the lower target groups achieved lower blood pressure, this did not prolong survival or reduce stroke, heart attack, heart failure, or kidney failure. There is no evidence to support aiming for a BP target less than 140/90 mmHg in any hypertensive patient without co-morbidities.
There is less consensus on whether BP should be lowered to a greater degree (< 130/80 mmHg) in individuals with hypertension-associated co-morbidities such as chronic kidney disease (CKD) or diabetes.

A randomized controlled trial, ACCORD-BP, compared a SBP treatment goal of < 120 mmHg vs. SBP treatment goal of < 140 mmHg for patients with co-existing diabetes.  

**Conclusion:** There is no difference in cardiovascular death, nonfatal myocardial infarction, nonfatal stroke and reduction of stroke between the two SBP treatment goals. The results from the ACCORD-BP trial did not provide sufficient evidence to recommend a lower SBP of < 120 mmHg.

There is a growing consensus that BP goals should be more lenient in the elderly population (patients ≥ 80 years of age). Recent trials suggest that in people aged 80 or more achieving a SBP of less than 150 mmHg is associated with strong cardiovascular and stroke protection.

### Lifestyle Modifications

**Lifestyle modifications** are an important component of preventing and managing hypertension as well. Weight loss, exercise, and dietary changes can help patients achieve a blood pressure goal of < 140/90 mmHg.

<table>
<thead>
<tr>
<th>Lifestyle Modifications</th>
<th>Recommendation</th>
<th>Approximate SBP Reduction (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss</td>
<td>Maintain normal body weight (body mass index 18.5 - 24.9 kg/m²).</td>
<td>5 - 20 mmHg per 10 kg weight loss</td>
</tr>
<tr>
<td>Increased physical activity</td>
<td>Engage in regular aerobic physical activity such as brisk walking at least 30 min per day, most days of the week.</td>
<td>4 - 9 mmHg</td>
</tr>
<tr>
<td>Reduced alcohol consumption</td>
<td>Limit consumption to no more than 2 drinks (e.g. 24 oz beer, 10 oz wine or 3 oz 80-proof whiskey) per day in most men, and to no more than 1 drink per day in women and lighter weight persons.</td>
<td>2 - 4 mmHg</td>
</tr>
<tr>
<td>Adoption of Dietary Approaches to Stop Hypertension (DASH) eating plan</td>
<td>Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat.</td>
<td>8 - 14 mmHg</td>
</tr>
<tr>
<td>Smoking Cessation</td>
<td>All patients should be screened for smoking habits. Patients should seek treatment including counseling and pharmacological agents.</td>
<td>Smoking cessation will not reduce blood pressure but smoking is a major cardiovascular risk factor. Patients must be strongly urged to discontinue this habit.</td>
</tr>
<tr>
<td>Lower sodium intake</td>
<td>Consume no more than 2,400 mg of sodium/day.</td>
<td>2 - 8 mmHg</td>
</tr>
</tbody>
</table>

### Key Message 2

Most patients will require more than one medication to control blood pressure. Preferred two-drug therapy includes an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker with either a thiazide-type diuretic or dihydropyridine calcium channel blocker.  

- In general, none of these drug classes is superior to the others.
- With respect to first-line treatment recommendations, what matters most is the degree of BP lowering that is sustained in order to prevent morbidity and mortality.
- Standard-dose monotherapy lowers BP up to 10 mmHg.
- Most patients will require more than one drug to achieve blood pressure control.
### Treatment of Hypertension

<table>
<thead>
<tr>
<th>Stages of Hypertension*</th>
<th>Recommendations*</th>
</tr>
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<tbody>
<tr>
<td><strong>Stage 1</strong> <em>(systolic 140 to 159 or diastolic 90 to 99 mmHg)</em></td>
<td>Consider some months of regularly monitored <strong>lifestyle management without drugs</strong> for patients without cardiovascular risk factors or abnormal findings.</td>
</tr>
<tr>
<td><strong>Stage 2</strong> <em>(BP ≥ 160/100 mmHg)</em></td>
<td>Drug treatment should be started immediately after diagnosis usually with a <strong>two drug combination</strong> without waiting to see the effects of lifestyle changes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guideline</th>
<th>1st line treatment recommendations for essential hypertension</th>
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</table>
| JNC 8\(^5\) 2013 | For general non-black population including patients with diabetes: *Thiazide-type diuretic, ACE inhibitor, ARB, CCB or combination*  
In general black population including patients with diabetes: *Thiazide-type diuretic or CCB*  
In general population aged ≥ 18 years with CKD and hypertension: *(Initial or add-on) ACE inhibitor, ARB* |
| ASH/ISH\(^4\) 2014 | White and other non-black patients: aged < 60 years: *ACE inhibitor or ARB*  
White and other non-black patients: aged ≥ 60 years: *thiazide, ACE inhibitor, ARB, CCB or combination*  
Black patients all ages: *thiazide or CCB*  
For patients with hypertension and symptomatic heart failure: *ACE inhibitor or ARB + beta-blockers + diuretic + spironolactone regardless of BP*  
DHP CCB can be added if needed for BP control  
For patients with hypertension and clinical CAD or stroke history: *ACE inhibitor or ARB* |
| AHA/ACC/CDC\(^1\) 2014 | Thiazide for most, may consider ACE inhibitor, ARB, CCB, or combination |
| ESH/ESC\(^3\) 2013 | All antihypertensive agents are suitable for initiation and maintenance either as monotherapy or in combinations: *diuretics, beta-blockers, calcium channel blockers, ACE inhibitor and ARB*  
Patients with heart failure or severe LV dysfunction: *diuretics, beta-blockers, ACE inhibitors/ARB or spironolactone (all are recommended to reduce mortality and hospitalization)* |
| ISHIB\(^6\) 2010 | CCB or diuretic if monotherapy; *(ACE inhibitor/ARB) + (thiazide/CCB) if combo* |

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**Preferred Anti-hypertensive Therapy**

- A combination of anti-hypertensives is often required to achieve and sustain BP reduction in most people with hypertension.\(^9\)-\(^12\)
  - If untreated BP is 20/10 mmHg above the target BP goal consider starting treatment with 2 antihypertensive agents\(^1\),\(^4\),\(^5\)
  - Many anti-hypertensive drugs have low ceiling drug response curves, and the incremental blood pressure reduction from adding a second agent is often much more powerful than doubling the dose of an existing medication.\(^12\)
Patients will most likely experience fewer side effects with lower doses of two separate antihypertensives than with a high dose of one drug.\(^12\)

The most effective antihypertensive combinations are those with similar pharmacodynamics but complementary mechanisms of action.\(^12\)

**Preferred Anti-Hypertensive Therapy for Primary Hypertension**

- **ACE inhibitor/ARB + thiazide-type diuretic**
- **ACE inhibitor/ARB + DHP CCB**

**Thiazide-Type Diuretics**

- Clinical outcome benefits such as reduction of strokes and major cardiovascular events have been best established with chlorthalidone, indapamide, and hydrochlorothiazide; although clinical evidence for the first two of these agents has been the strongest.\(^4,5\) Chlorthalidone has greater potency in reduction of systolic blood pressure compared to hydrochlorothiazide and has a longer duration of action.\(^4,17\)
- A retrospective, observational cohort study found no difference between chlorthalidone and hydrochlorothiazide in terms of preventing stroke, myocardial infarction, heart failure or death in older adults (aged ≥66 years) and patients treated with chlorthalidone were more likely to experience hospitalization due to hypokalemia and hyponatremia.\(^15\) By contrast, a meta-analysis found that chlorthalidone is superior to hydrochlorothiazide in reducing cardiovascular events.\(^16\)
- Chlorthalidone may be the preferred thiazide-type diuretic for patients with hypertension but other factors such as age and comorbidities need to be taken in consideration.

**ACE-Inhibitors vs. ARBs**

- A 2014 Cochrane review compared the efficacies of ACE inhibitors versus ARBs in preventing total mortality and cardiovascular events in patients with primary hypertension.\(^13\)
  - **Conclusion:** No difference in total mortality and cardiovascular events between the two classes. Although ARBs, in general, are more tolerable, evidence is lacking in placebo-controlled trials for hypertension regarding efficacy in mortality and morbidity outcomes. **There is no evidence to support substituting ACE inhibitors with ARBs in patients without contraindications or intolerability.**
  - ACE inhibitors should NOT be used in combination with ARBs due to a greater incidence of side effects without any outcome benefits.\(^14\)

**REFERENCES:**