

# American and European Hypertension Guidelines: Finding Common Ground



Hypertension is the leading cause of death, premature morbidity, and disability-adjusted life years worldwide. Chronic hypertension is a predisposing factor to the development of coronary artery disease, cerebrovascular disease, systemic atherosclerosis, congestive heart failure, chronic kidney disease and dementia.<sup>1,2</sup> Despite various regional and global efforts to control hypertension, its prevalence remains high and is estimated to impact more than 1.13 billion people worldwide.<sup>3</sup> In the United States, hypertension accounts for more cardiovascular disease (CVD) deaths than any other modifiable risk factor and is second only to cigarette smoking as a preventable cause of death. The 2017 American College of Cardiology/American Heart Association (ACC/AHA)<sup>4</sup> and 2018 European Society of Cardiology/European Society of Hypertension (ESC/ESH) blood pressure (BP) guidelines<sup>5</sup> provide a comprehensive, evidence-based approach to the prevention, detection, evaluation and management of high BP. Due to the attention drawn by the release of these much-anticipated guidelines, it is important to understand the similarities and key differences between them that are bound to have a global influence.

## Key Features of the American and European Guidelines

### *Classification of BP and Diagnosis of Hypertension*

When comparing the guidelines, the definition of normal or optimal BP is the same systolic BP <120 mm Hg and diastolic BP <80 mm Hg. However, the ACC/AHA guidelines replace “prehypertension” with “elevated blood pressure” for BP levels 120-129/80-89 mm Hg while the Europeans define this category as “normal blood pressure”. The American cut off for the definition of hypertension has been lowered to  $\geq 130/80$  mm Hg while the threshold target BP goal has been changed to  $\leq 130/80$  mm Hg (Table 1). According to this new classification, many more millions of adults require surveillance and possibly treatment. This change is estimated to result in a 14% increase the prevalence of hypertension in the United States but only a 1.9% increase in adults requiring antihypertensive therapy.<sup>6</sup> Due to the twofold increase in CVD risk and recent randomized clinical trials demonstrating benefits of aggressive BP lowering to < 130 mm Hg, the upper boundary of prehypertension (BP range 130-139/80-89 mm Hg) is now classified as stage 1 hypertension.<sup>7</sup> While lowering the threshold levels for diagnosis and treatment of hypertension has created controversy in the American public and in its major medical societies, there is strong evidence for increased CVD risk for systolic BP levels between 130 and 139 mm Hg and diastolic BP levels between 80 and 89 mm Hg. In contrast, the 2018 ESC/ESH guidelines do not lower the hypertension threshold definition (> 140/90 mm Hg); however, they acknowledge that 130-139/80-89 mm Hg is high normal BP. A deeper dive into both guidelines reveals similarities in many treatment targets. Both ACC/AHA and ESC/ESH

guidelines stress aggressive lowering of BP to <130/80 mm Hg for most patients (Table 2).

### *Measurement of BP and Emphasis on Ambulatory and Home BP monitoring*

Both guidelines endorse greater use of out of office BP measurements to confirm the diagnosis of hypertension and for treatment recommendations. Out-of-office BP measurement refers to the use of either home BP monitoring (HBPM) or ambulatory BP monitoring (ABPM), the latter usually over 24 hours. There is general consensus that these provide a larger number of BP measurements than conventional office BPs and reflect conditions that are more representative of daily life. A major advantage of both ABPM and HBPM is that they enable the diagnosis of white-coat and masked hypertension. The guidelines recommend that for adults who are not using antihypertensive therapy, ABPM or HBPM should be utilized to detect white coat-hypertension. Masked hypertension refers to untreated patients who have normal BPs in the office but elevated readings when measured by ABPM or HBPM and is associated with increased cardiovascular morbidity and mortality.

### *CVD Risk Estimation for Hypertension Management*

ESC guidelines utilize the Systematic Coronary Risk Evaluation (SCORE) system to initiate and standardize pharmacotherapy in patients with hypertension. Since 2003, the European guidelines on CVD prevention have recommended SCORE because it is based on large, representative European cohort datasets. The SCORE system estimates the 10-year risk of a first fatal atherosclerotic event in relation to age, sex, smoking habits, total cholesterol level, and systolic BP. It also allows calibration for different CVD risk levels across numerous European countries and has been externally validated. Similarly, the ACC/AHA guidelines recommend use of the Atherosclerotic Cardiovascular Disease Risk calculator for determination of BP targets. Both guidelines recognize that treatment decisions based on aligning thresholds with CVD risk offer a more rational and evidence-based clinical approach. While the European guidelines identify hyperuricemia and elevated heart rate as CVD risk factors, there is no evidence that treatment of these improves clinical outcomes.

### *Lifestyle Modifications and Nonpharmacologic Interventions*

ACC/AHA and ESC/ESH guidelines stress the importance of weight loss in overweight and obese adults, eating a heart healthy diet (e.g., DASH), sodium restriction, increasing physical activity with a structured exercise program, abstinence from or moderation in alcohol consumption and smoking cessation. (Class 1, evidence level A). Both emphasize that effective lifestyle changes may be sufficient to delay or prevent the need for drug therapy in

Table 1  
Comparison of ACC/AHA and ESC/ESH blood pressure thresholds

	ACC/AHA	ESC/ESH
Definition of hypertension (mm Hg)	> 130/80	> 140/90
Normal blood pressure ranges (mm Hg)	Normal: < 120/80 Elevated: 120-129/<80	Optimal: < 120/80 Normal: 120-129/80-84 High normal: 130-139/85-89
Hypertension stages (mm Hg)	Stage 1: 130-139/80-89 Stage 2: ≥ 140/90	Stage 1: 140-159/90-99 Stage 2: 160-179/100-109 Stage 3: ≥ 180/110
Age-specific blood pressure targets (mm Hg)	< 65 years: < 130/80 ≥ 65 years: < 130/80	< 65 years: < 130/80 ≥ 65 years: < 140/80

patients with stage 1 hypertension/high normal BP. Patients with stage 2/stage 3 hypertension, pharmacotherapy should be initiated without delay, but lifestyle and behavioral interventions should be concurrently emphasized. Weight reduction is recommended to target a healthy Body Mass Index (BMI) (19 to 25 kg/m<sup>2</sup>) and to avoid obesity (BMI >30 kg/m<sup>2</sup>). Hypertensive patients are advised to eat a balanced diet containing vegetables, legumes, fresh fruits, low-fat dairy products, whole grains, fish and fowl, and unsaturated fatty acids (especially olive oil) while minimizing consumption of red meat and saturated fat. Moderate intensity exercise for 30 minutes daily, at least 5 times a week, is encouraged, including any dynamic aerobic exercise such as walking, jogging, cycling, or swimming.

**Key Differences Between the American and European Guidelines**

*BP Goals and Threshold in Older Adults*

Unlike the 2017 ACC/AHA recommendation for similar BP targets across all age groups, the ESC/ESH guidelines have taken a more restrained stance on BP thresholds in older adults. The 2013 ESC/ESH guidelines endorsed a BP target of <150/90 mm Hg for adults >65 years old. The 2018 committee recognizes the importance of more aggressive BP control for all populations, including older cohorts, and supports lowering the threshold to <140/80 mm Hg for this group. The new guidelines strongly encourage treatment of BP for adults 65 and older. Consistent with the ACC/AHA recommendations, there is acknowledgment of the difference between biological versus chronological age and the

importance of assessing other factors, such as frailty and tolerability of treatment, to guide BP management in this population. The authors point out that while the Systolic Blood Pressure Intervention Trial (SPRINT) included a high proportion of patients over >75 years who had varying degrees of frailty, they were still independently living.<sup>8</sup> The Hypertension in the Very Elderly Trial (HYVET) trial targeted individuals >80 years and similarly included active, older adults.<sup>9</sup> The cautious approach taken by the Europeans may reflect some of the concerns raised by the American Academy of Family Physicians and American College of Physicians (AAFP/ACP) who felt that the aggressive ACC/AHA targets were not sufficiently supported by meta-analyses of the randomized controlled trials with consideration of adverse events.<sup>10</sup>

*BP Goals in Specific Populations*

The ESC/ESH guidelines rationalize their recommendations for BP thresholds in specific populations, including different ethnic groups, diabetes, kidney disease, and pregnancy (Tables 3 and 4). Given the heterogeneity of ethnic groups in Europe, blacks in particular, and the lack of a sufficient database to assess cardiovascular outcomes in minority groups, the European guidelines extrapolate outcomes and data from American cohorts (blacks only). They recognize this as a clear deficiency and an opportunity for future research. A unique aspect of the European SCORE risk estimate is the use of correction factors to reflect CVD risk differences in the first generation immigrants to Europe. American guidelines recognize differences in CVD risk between specific Asian and Hispanic subgroups. No

Table 2  
Blood pressure treatment and goals are the same

Hypertension definition (mm Hg)	Blood pressure treatment target (mm Hg)
2018 ESC/ESH: > 140/90	
	
2017 ACC/AHA: > 130/80	< 130/80

Table 3  
2018 ESC/ESH Office blood pressure treatment targets (if tolerated)

Age group (years)	Hypertension (mm Hg)	+ Diabetes (mm Hg)	+ CKD (mm Hg)	+ CAD (mm Hg)	+ Stroke/TIA (mm Hg)	Diastolic treatment target range (mm Hg)
18-65	Target to 130	Target to 130	Target to 130	Target to 130	Target to 130	< 80 to 70
65-79	Target to < 140 to 130	Target to < 140 to 130	Target to < 140 to 130	Target to <140 to 130	Target to <140 to 130	< 80 to 70
≥80	Target to < 140 to 130	Target to < 140 to 130	Target to < 140 to 130	Target to <140 to 130	Target to <140 to 130	< 80 to 70
Diastolic treatment target range (mm Hg)	< 80 to 70	< 80 to 70	< 80 to 70	< 80 to 70	< 80 to 70	< 80 to 70

Adapted from Williams B, Mancia G et al: 2018 ESC/ESH Guidelines for the management of arterial hypertension. Eur Heart J 2018; 39(33):3021-3104.

Table 4  
ACC/AHA Blood pressure thresholds for pharmacological therapy

Clinical condition(s)	Blood pressure threshold (mm Hg)	Blood pressure goal (mm Hg)
Clinical CVD or 10 year ASCVD risk > 10%	≥130/80	< 130/80
No clinical CVD and 10-year ASCVD risk < 10%	≥ 140/90	< 130/80
Older persons (>65 years of age, noninstitutionalized, ambulatory and community-living adults)	≥ 130 (SBP)	< 130 (SBP)
Diabetes mellitus	≥ 130/80	< 130/80
Chronic kidney disease	≥ 130/80	< 130/80
Chronic kidney disease after renal transplantation	≥ 130/80	< 130/80
Heart failure	≥ 130/80	< 130/80
Stable ischemic heart disease	≥ 130/80	< 130/80
Secondary stroke prevention	≥ 140/90	< 130/80
Secondary stroke prevention (lacunar)	≥ 130/80	< 130/80
Peripheral arterial disease	≥ 130/80	< 130/80

Adapted from Whelton PK et al.<sup>4</sup>

multiplier exists to refine the risk calculator in these populations. It is of extreme importance that the European guidelines have identified hypertensive patients of South Asian origin as the highest risk group.

Consistent with the recent American Diabetes Association recommendations for BP targets in diabetics, the ESC/ESH recommends a BP threshold of >140/90 mm Hg for initiation of antihypertensive therapy.<sup>11</sup> However, in concert with US guidelines, they endorse a target BP <130/80 mm Hg for diabetic patients. While the Europeans recommend combination antihypertensive therapy with renin angiotensin system blocker + calcium channel blocker or thiazide diuretic, no specific drug combinations are offered in the American guidelines. For patients with kidney disease, the European guidelines contend that there is insufficient evidence to support treatment targets much lower than 140/90 mm Hg.

Table 5  
Initial pharmacological therapies for hypertension

American guidelines	European guidelines
Diuretics	Diuretics
Calcium channel blockers	Calcium channel blockers
Angiotensin receptor blockers	Angiotensin receptor blockers
Angiotensin converting enzyme inhibitors	Angiotensin converting enzyme inhibitors
	Beta-blockers

For hypertension and pregnancy, the European guidelines provide clear definitions and classifications as well as comprehensive recommendations for laboratory testing, risk stratification, and pharmacotherapy. Additionally, there is discussion about the impact of hormone replacement therapy and oral contraceptives on BP.

#### Pharmacologic Management of Hypertension

There is general consensus on pharmacological management of hypertension between US and European guidelines. Antihypertensive therapy for specific disease states such as chronic kidney disease, heart failure reduced ejection fraction, and stable ischemic heart disease are nearly identical. The Europeans still include beta-blockers in the first line options for hypertension management while American guidelines specify their primary use only for patients with ischemic heart disease or heart failure reduced ejection fraction (Table 5). While ACC/AHA recommends a single pill combination for Stage 2 hypertension, the ESC/ESH encourages this for all stages of hypertension to quickly achieve BP targets.

#### Conclusions

After careful review of the hypertension guidelines, we find more common ground with our European colleagues

than major differences. Both guidelines strongly recommend lower targets for controlling hypertension to arrest the onset and relentless progression of BP-mediated target organ damage. Similar emphasis is placed on proper BP measurement and technique, laboratory and diagnostic testing, lifestyle and behavioral changes, and pharmacological management. Even though the European guidelines do not change the hypertension definition thresholds, they acknowledge that lower BP (e.g., <130/80 mm Hg) reduces cardiovascular morbidity and mortality. While the newer aggressive BP goals may be challenging to achieve, the medical community should be wise to be adept and adopt the latest therapeutic recommendations.<sup>12</sup>

Perhaps the European recommendations reflect concerns raised by the AAFP/ACP on the unintended consequences of changing the BP thresholds. What is the potential psychological impact to patients now diagnosed with hypertension and how will this impact their ability to be insured? Performance metrics using lower BP thresholds may have significant financial consequences in the growing shared risk contracts many health care providers and systems are now entering. Even if the majority of patients do not reach the new target <130/80 mm Hg, the heightened global awareness and treatment of hypertension will have far reaching benefits for long term global public health. As stated in a recent editorial,<sup>13</sup> “we need to accept the available evidence to extinguish the pernicious consequences of elevated BP by early diagnosis and by a ‘war like’ footing to lower the BP levels to the new thresholds.”

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