

# The new normal in blood pressure diagnosis and management: Lower is better

The revised definition of normal blood pressure (systolic blood pressure <120 mm Hg and diastolic blood pressure <80 mm Hg) will result in major changes in the clinical care of mid-life women



**Robert L. Barbieri, MD**

Editor in Chief, OBG MANAGEMENT  
 Chair, Obstetrics and Gynecology  
 Brigham and Women's Hospital, Boston, Massachusetts  
 Kate Macy Ladd Professor of Obstetrics,  
 Gynecology and Reproductive Biology  
 Harvard Medical School, Boston

For many years, the approach to the diagnosis of hypertension was straight-forward—multiple blood pressure (BP) measurements  $\geq 140/90$  mm Hg established the diagnosis of hypertension, a disease associated with an increased risk of adverse cardiovascular events, including myocardial infarction and stroke. For more than a decade, hypertension experts have argued that a BP  $\geq 130/80$  mm Hg should establish the diagnosis of hypertension. Many clinicians resisted the change because it would markedly increase the number of asymptomatic adults with the diagnosis, increasing the number needing treatment. However, the findings of the Systolic Blood Pressure Intervention Trial (SPRINT) and other observational studies have catalyzed the American College of Cardiology (ACC) and the American Heart Association (AHA) to redefine normal BP as <120/80 mm Hg.<sup>1</sup> This change will expand the diagnosis of hypertension to include up to 50% of American adults.<sup>1</sup> In addition, the new definition of normal BP will result in the greater use of lifestyle interventions and antihypertensive medications to achieve the new normal, a BP of <120/80 mm Hg.

## The new definition of hypertension

The new definition of hypertension is of particular importance for people at risk for developing cardiovascular disease (CVD)<sup>1,2</sup> and is summarized here.

- Normal BP: systolic BP (SBP) <120 mm Hg and diastolic BP (DBP) <80 mm Hg
- Elevated BP: SBP 120–129 mm Hg and DBP <80 mm Hg
- Stage 1 hypertension: SBP 130–139 mm Hg or DBP 80–89 mm Hg.
- Stage 2 hypertension: SBP  $\geq 140$  mm Hg or DBP  $\geq 90$  mm Hg.

The new definition of hypertension will markedly increase the number of mid-life adults eligible to be treated for hypertension. I summarize the approach to treating hypertension in this article.

## For mid-life adults, a SBP of <120 mm Hg is better for the heart

The heart is a pump, and not surprisingly, if a pump can achieve its job at a lower rather than a higher pressure, it is likely to last longer. The SPRINT study clearly demonstrated that in

elderly hypertensive adults, an SBP target of <120 mm Hg is associated with fewer deaths than a SBP in the range of 130 to 140 mm Hg.<sup>3</sup>

In the SPRINT trial, 9,361 people with a mean age, body mass index, and BP of 68 years, 30 kg/m<sup>2</sup> and 140/78 mm Hg, respectively, were randomly assigned to intensive treatment of SBP to a goal of <120 mm Hg or to a target of <140 mm Hg. After 1 year of treatment, the intensive treatment group had a mean SBP of 121 mm Hg and the standard treatment group had a mean SBP of 136 mm Hg. To achieve a SBP <120 mm Hg, most patients required 3 antihypertensive medications, in contrast to the 2 antihypertensive medications typically needed to achieve a SBP in the range of 130 to 140 mm Hg.

After a median of 3.3 years of follow-up, significantly fewer deaths occurred in the intensive treatment group than in the standard treatment group, including deaths from all causes (3.3% vs 4.5%,  $P = .003$ ) and deaths from CVD (0.8% vs 1.4%;  $P = .005$ ). In addition, the risk of developing heart failure was lower in the intensive treatment than in the

CONTINUED ON PAGE 14

standard treatment group (1.3% vs 2.1%,  $P = .002$ ). There was no difference between the 2 groups in the risk of stroke (1.3% vs 1.5%,  $P = .50$ ) or myocardial infarction (2.1% vs 2.5%,  $P = .19$ ). The rate of syncope was higher in the intensive treatment group (2.3% vs 1.7% in the standard treatment group,  $P = .05$ ).<sup>3</sup> Self-reported mental and physical health and satisfaction with treatment was similar in both groups.<sup>4</sup>

The investigators concluded that among people at risk for CVD, targeting a SBP of <120 mm Hg as compared to <140 mm Hg resulted in lower rates of heart failure and death, two clinically meaningful endpoints.

## Diet and exercise

**Nonpharmacologic interventions, including diet and exercise, are recommended for all people with a BP >120/80 mm Hg.** In most situations, antihypertensive medications are not necessary if the patient has elevated BP (SBP 120–129 mm Hg and DBP <80 mm Hg) or Stage 1 hypertension (SBP 130–139 mm Hg or DBP 80–89 mm Hg) and a 10-year CVD risk of less than 10% using the ACC/AHA cardiovascular risk calculator<sup>5</sup> (see <http://www.cvriskcalculator.com/>). For people at low risk for CVD, nonpharmacologic interventions, including diet and exercise, are often sufficient treatment.

The Dietary Approaches to Stop Hypertension (DASH) diet emphasizes increasing consumption of fruits, vegetables, low-fat dairy, whole-grains, fish, poultry, and nuts and decreasing the consumption of red meats, sugary drinks, sweets, sodium, and saturated and trans-fats. In randomized trials, the DASH diet is associated with a reduction in BP of approximately 5 mm Hg systolic and 3 mm Hg diastolic.<sup>6</sup> The DASH

trial monitored weight changes and adjusted calorie intake to ensure a stabilized weight throughout the study. Hence, the positive effect of the DASH diet was observed in the absence of any weight loss. Weight loss also can decrease BP with every 1- to 2-lb weight loss, reducing SBP by approximately 1 mm Hg.<sup>7</sup> Combining the DASH diet with a low-sodium diet is especially important in people with high sodium intake, and is reported to reduce SBP by 5 to 20 mm Hg.<sup>8</sup> Reducing the consumption of alcohol can result in a reduction of SBP and DBP in the range of 3 and 2 mm Hg, respectively.<sup>9</sup>

Exercising for 40 minutes, 3 to 4 times per week is associated with a reduction of SBP and DBP of approximately 5 and 3 mm Hg, respectively.<sup>10</sup> Although the studies are of low quality, meditation is reported to decrease SBP and DBP by 4 and 2 mm Hg, respectively.<sup>11</sup>

## Antihypertensive medications

**For all mid-life adults with Stage 2 hypertension (SBP ≥140 mm Hg or DBP ≥90 mm Hg) or with both clinical CVD and Stage 1 hypertension, antihypertensive medications are recommended.**<sup>1</sup> For people with Stage 1 hypertension and a 10-year CVD risk of ≥10%, antihypertensive medications are recommended. The target BP is <130/80 mm Hg for most people.

The recommended antihypertensive medications include thiazide diuretics, calcium channel blockers (CCBs), angiotensin-converting enzyme (ACE) inhibitors, and angiotensin II receptor blockers (ARBs). Many patients with Stage 2 hypertension will need treatment with 2 agents of different classes to achieve a BP <130/80 mm Hg. Some experts

believe that an optimal 2-agent regimen includes an ACE or ARB plus a CCB based on the results of the ACCOMPLISH trial.<sup>12</sup> In this trial, 11,506 adults with hypertension and at very high risk for CVD, were randomly assigned to treatment with an ACE inhibitor plus CCB or with an ACE inhibitor plus hydrochlorothiazide. The BP achieved in both groups was approximately 132/73 mm Hg. The study was stopped after 3 years because participants in the ACE/thiazide group had a higher rate of adverse cardiovascular events (myocardial infarction, stroke, or death) than those in the ACE/CCB group (11.8% vs 9.6%; hazard ratio [HR], 0.80; 95% confidence interval [CI], 0.72–0.90;  $P < .001$ ). Compared to the ACE/thiazide group, the ACE/CCB group had a significantly lower rate of fatal and nonfatal myocardial infarction (2.2% vs 2.8%; HR, 0.78; 95% CI, 0.62–0.99;  $P = .04$ ) and a lower rate of death from cardiovascular causes (1.9% vs 2.3%; HR, 0.80; 95% CI, 0.62–1.03,  $P = .08$ ).

Worldwide, approximately 1 billion adults have a SBP ≥140 mm Hg.<sup>13</sup> In the United States, 32% of adult women have Stage 2 hypertension or are taking an antihypertensive medication (TABLE).<sup>1</sup> There is a generally linear relationship between increasing SBP and DBP and an increased risk of a cardiovascular event, including heart failure, myocardial infarction, and stroke. An increase of SBP of 20 mm Hg or DBP of 10 mm Hg above a baseline BP of 115/75 mm Hg doubles the risk of death from CVD.<sup>14</sup> For adults at risk for CVD, intensive treatment of hypertension clearly reduces the risk of a life-changing cardiovascular event.

It will probably take many years for the new SBP target of <120 mm Hg to be fully accepted by clinicians and patients because, although achieving

**TABLE** Prevalence of Stage 2 hypertension or self-reported use of antihypertension medication among US women by age and race-ethnicity<sup>1,a</sup>

Age group, y	SBP $\geq$ 140 or DBP $\geq$ 90 mm Hg or self-reported use of antihypertension medication
20–44	10%
45–54	27%
55–64	52%
65–74	63%
$\geq$ 75	78%
<b>Race-Ethnicity</b>	
Non-Hispanic white	30%
Non-Hispanic black	46%
Non-Hispanic Asian	27%
Hispanic	32%

<sup>a</sup>Sample size = 4,906, National Health and Nutrition Examination Survey 2011–2014.

a SBP of <120 mm Hg will decrease cardiovascular events, it is a very difficult target to achieve, requiring treatment with 3 antihypertensive medications for most patients. The early diagnosis and intensive treatment of hypertension is challenging because it requires clinicians to initiate a multi-decade course of treatment of asymptomatic people with the goal of preventing a life-altering cardiovascular event, including stroke and myocardial infarction. ●



RBARBIERI@FRONTLINEMEDCOM.COM

*Dr. Barbieri reports no financial relationships relevant to this article.*

#### References

- Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines [published online ahead of print November 7, 2017]. *J Am Coll Cardiol*. doi:10.1016/j.jacc.2017.11.005.
- Cifu AS, Davis AM. Prevention, detection, evaluation and management of high blood pressure in adults. *JAMA*. 2017;318(21):2132–2134.
- Wright JT Jr, Williamson JD, Whelton PK; SPRINT Research Group. A randomized trial of intensive versus standard blood-pressure control. *N Engl J Med*. 2015;373(22):2103–2116.
- Berlowitz DR, Foy CG, Kazis LE, et al; SPRINT Research Group. Effect of intensive blood-pressure treatment on patient-reported outcomes. *N Engl J Med*. 2017;377(8):733–744.
- American College of Cardiology and American Heart Association. Heart risk calculator. <http://www.cvriskcalculator.com/>. Accessed January 22, 2018.
- Moore TJ, Vollmer WM, Appel LJ, et al. Effect of dietary patterns of ambulatory blood pressure results from the Dietary Approaches to Stop Hypertension (DASH) Trial. *DASH Collaborative Research Group*. *Hypertension*. 1999;34(3):472–477.
- Stevens VJ, Corrigan SA, Obarzanek E, et al. Weight loss intervention in phase 1 of the Trials of Hypertension Prevention. The TOHP Collaborative Research Group. *Arch Intern Med*. 1993;153(7):849–858.
- Juraschek SP, Miller ER, Weaver CM, Appel LJ. Effects of sodium reduction and the DASH diet in relation to baseline blood pressure. *J Am Coll Cardiol*. 2017;70(23):2841–2848.
- Xin X, He J, Frontini MG, Ogden LG, Motsamai OI, Whelton PK. Effects of alcohol reduction on blood pressure: a meta-analysis of randomized controlled trials. *Hypertension*. 2001;38(5):1112–1117.
- Cornelissen VA, Buys R, Smart NA. Endurance exercise beneficially affects ambulatory blood pressure: a systematic review and meta-analysis. *J Hypertens*. 2013;31(4):639–648.
- Bai Z, Chang J, Chen C, Li P, Yang K, Chi I. Investigating the effect of transcendental meditation on blood pressure: a systematic review and meta-analysis. *J Hum Hypertens*. 2015;29(11):653–662.
- Jamerson K, Weber MA, Bakris GL, et al; ACCOMPLISH Trial Investigators. Benazepril plus amlodipine or hydrochlorothiazide for hypertension in high-risk patients. *N Engl J Med*. 2008;359(23):2417–2428.
- Forouzanfar MH, Liu P, Roth GA, et al. Global burden of hypertension and systolic blood pressure of at least 110 to 115 mm Hg, 1990–2015. *JAMA*. 2017;317(2):165–182.
- Swedish Council on Health Technology Assessment. Moderately elevated blood pressure: a systematic review. <https://www.ncbi.nlm.nih.gov/books/NBK448011/>. Published September 2008. Accessed January 22, 2018.