Hypertension Guidelines in the United States and Canada
Are We Getting Closer?

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See related article, pp e13–e115

The American College of Cardiology/American Heart Association (ACC/AHA) with 9 other organizations recently released new guidelines for the prevention, detection, evaluation, and management of hypertension in adults, including new blood pressure (BP) treatment thresholds and targets.[1] The previous US guidelines released in 2014 caused some controversy by recommending relaxed treatment goals for several high-risk subgroups, including patients aged ≥60 years and those with diabetes mellitus or kidney disease.[2] Instead, the new ACC/AHA guidelines provide a single, more intensive BP target for BP management, regardless of age or comorbid conditions. Overall, these new guidelines are more aligned with the 2017 Hypertension Canada guidelines[3] and share similar key messages given that both sets of guidelines were derived from the same clinical evidence. However, some differences between ACC/AHA and Hypertension Canada are notable and warrant further discussion.

First, diagnosis of hypertension. In the ACC/AHA guidelines, hypertension diagnosis is set as BP ≥130/80[1] versus ≥140/90 mm Hg in Hypertension Canada and other international guidelines.[3,4] However, most people in the BP bracket of 130 to 139/80 to 89 mm Hg (stage 1 hypertension according to the new ACC/AHA guidelines) will have low cardiovascular risk, and both guidelines encourage health behavior modification for low-risk patients.

Although observational studies demonstrate a doubling in cardiovascular risk in patients with pressures of 130 to 139/80 to 89 mm Hg compared with optimal readings, the absolute 10-year cardiovascular risk increase is relatively small. In a recent meta-analysis of 74 trials (n=306 273 participants),[5] BP lowering for primary prevention was associated with decreased risk for cardiovascular disease and mortality only if baseline systolic BP was ≥140 mm Hg. The benefits for BP lowering when systolic BP was below a threshold of 140 mm Hg were only experienced in higher risk, secondary prevention participants (ie, risk reduction in nonfatal major cardiovascular events in patients with coronary heart disease). Consistent with compelling evidence[6] for high-risk patients, both Hypertension Canada and the ACC/AHA guidelines recommend initiating pharmacotherapy in the 130 to 139/80 to 89 mm Hg BP bracket. However, there is a lack of high-quality data evaluating low-risk populations or individual-based interventions to reduce cardiovascular morbidity and mortality. Based on the new ACC/AHA guidelines, it is estimated that the prevalence of hypertension in US adults will increase by 13.7% (or 31.1 million Americans), making a total of 45.6% of the American adult population hypertensive.[7] The impact will be most notable in those under the age of 45 years and in women.[7] The effects of labeling this low-risk population as having hypertension is unclear, and the impact of this mass reclassification will have on health insurance or health behavior change is not yet known.

Second, thresholds for initiating antihypertensive pharmacotherapy. The ACC/AHA guidelines recommend initiation of pharmacotherapy at a threshold of 130/80 mm Hg in subjects with a 10-year Atherosclerotic Cardiovascular Disease risk score of 10% or higher or clinical cardiovascular disease while the threshold of 140/90 mm Hg is recommended for those at low cardiovascular risk (10-year Atherosclerotic Cardiovascular Disease risk below 10%) and for secondary stroke prevention (Table).[1] In the ACC/AHA guidelines, the cutoff of 10% for the 10-year Atherosclerotic Cardiovascular Disease risk score to classify high-risk individuals is considerably different than the original 15% Framingham Risk Score (equivalent to 6%–7% 10-year Atherosclerotic Cardiovascular Disease risk) used in the SPRINT trial (Systolic Blood Pressure Intervention Trial), which Hypertension Canada has adopted.[1,3,6] Nevertheless, both guidelines recommend earlier treatment initiation for higher risk individuals or for secondary prevention (Table).

Although there is strong evidence to support the benefit from treatment initiation in people with moderate risk at a threshold of 140/90 mm Hg,[8] the evidence is less clear for low-risk patients, and the recommendations of the 2 guidelines are different. Specifically, the ACC/AHA guidelines recommend

The opinions expressed in this editorial are not necessarily those of the editors or of the American Heart Association.

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(*Hypertension*. 2018;71:976-978.
DOI: 10.1161/HYPERTENSIONAHA.117.10772.)

***Hypertension* is available at http://hyper.ahajournals.org**
DOI: 10.1161/HYPERTENSIONAHA.117.10772

Table. Blood Pressure Pharmacological Treatment Thresholds and Targets in Subjects With Hypertension According to the 2017 American College of Cardiology/American Heart Association Hypertension Guidelines and the 2017 Hypertension Canada Guidelines

	BP Thresholds for Drug Therapy (SBP/DBP, mm Hg)		BP Treatment Targets (SBP/DBP, mm Hg)	
Population	AHA/ACC	HC	AHA/ACC	HC
Clinical CVD or high CVD risk	≥130/80 (10-y ASCVD risk ≥10%)	≥130 (SBP; 10-y FRS ≥15%, or CKD, or age ≥75 y)	<130/80 (10-y ASCVD risk ≥10%)	≤120 (SBP; 10-y FRS ≥15%, or CKD, or age ≥ 75 y)
No clinical CVD and moderate CVD risk	≥140/90 (10-y ASCVD risk <10%)	≥140/90 (presence of multiple CV risk factors)	<130/80	<140/90
No clinical CVD and low CVD risk	≥140/90 (10-y ASCVD risk <10%)	≥160/100	<130/80	<140/90
Older people (noninstitutionalized, ambulatory, community-living adults)	≥130 (SBP) (age ≥65 y)	≥130 (SBP; age ≥75 y)	<130 (SBP; age ≥65 y)	≤120 (SBP; age ≥75 y)
Secondary stroke prevention	≥140/90	≥140/90	<130/80	<140/90
Diabetes mellitus	≥130/80	≥130/80	<130/80	<130/80
Peripheral arterial disease	≥130/80	≥140/90	<130/80	<140/90

AHA/ACC indicates American College of Cardiology /American Heart Association; ASCVD, atherosclerotic cardiovascular disease; BP, blood pressure; CKD, chronic kidney disease; CVD, cardiovascular disease; DBP, diastolic blood pressure; FRS, Framingham Risk Score; HC, Hypertension Canada; and SBP, systolic blood pressure.

initiation of pharmacotherapy at a threshold of 140/90 mm Hg even in low-risk patients with high BP,[1] whereas Hypertension Canada recommends treatment at 160/100 mm Hg[3] (Table). The threshold of 160/100 mm Hg is derived from BP entry criteria from hypertension clinical trials. However, there is a paucity of clinical trial evidence to support the benefit of pharmacological intervention in reducing cardiovascular mortality and morbidity for low-risk adults without cardiovascular risk factors and without target organ damage when BP is <160/100 mm Hg. Thus, the cost of treatment and the risk of treatment side-effects in these patients may not be well justified. A tailored, incremental risk-based approach to treatment will continue to be recommended by Hypertension Canada.

Third, BP targets. The ACC/AHA guidelines recommend a uniform BP treatment target of <130/80 mm Hg for all subjects regardless of cardiovascular risk (Table).[1] However, Hypertension Canada continues to recommend a BP target of <140/90 mm Hg in most individuals and lower targets for patients with diabetes mellitus (<130/80 mm Hg) or patients >50 years old at increased cardiovascular risk (systolic BP <120 mm Hg; Table).[3] The latter target was informed by the SPRINT trial, which included people >50 years of age at high cardiovascular risk.[6] SPRINT indicated that pharmacotherapy at systolic BP of 130 mm Hg or higher, using automated office BP devices, significantly reduced cardiovascular risk at a systolic BP target of <120 versus <140 mm Hg. This was consistent even for subjects >75 years of age or frail.[9,10] This lower target is also supported by recent meta-analyses, suggesting that intensive BP lowering provided greater cardiovascular benefit.[11–14] A meta-analysis of 123 trials (n=613 815 participants) demonstrated a strong linear relationship between systolic BP lowering and cardiovascular risk reduction, such that for every 10-mm Hg decrease in systolic BP, a significant 20% reduction in the risk of major cardiovascular disease events was noted (relative risk, 0.80; 95% confidence interval, 0.77–0.83).[13] In a more recent meta-analysis of 42 trials (n=144 220 patients), linear associations between mean achieved systolic BP and risk of cardiovascular disease and mortality were also noted, with the lowest risk at the level 120 to 124 mm Hg when compared with higher systolic BPs; indeed, subjects with a mean achieved systolic BP of 120 to 124 mm Hg had a hazard ratio for major cardiovascular disease of 0.71 (95% confidence interval, 0.60–0.83) compared with subjects with a mean achieved systolic BP of 130 to 134 mm Hg.[14] It is important to acknowledge that these meta-analyses did not include low-risk patients, and as such, Hypertension Canada has not extrapolated this evidence to low-risk patients. Clinical trials specifically examining treatment targets in low-risk individuals are needed to assess cost effectiveness and safety and inform the guidelines.

Although the 2017 ACC/AHA hypertension treatment target (<130/80 mm Hg) would appear to be influenced to a certain extent by the SPRINT trial, this target seems to have been adjusted presumably to accommodate use of nonautomated BP devices in clinical practice that tend to overestimate BP readings. At Hypertension Canada, we continue to advocate for improved accuracy of BP readings using automated BP devices and the SPRINT-specified target of 120 mm Hg in at risk patients. The impact of the new ACC/AHA single BP target is anticipated to be significant. Although only a small increase in the percentage of US adults recommended antihypertensive medications is expected, an additional 14.4% (or 7.9 million Americans) of pharmacologically treated patients will be considered to be above BP target and thus will require intensification of treatment.[7]

Fourth, choice of pharmacotherapy initiation. ACC/AHA recommends use of monotherapy as first line for treatment initiation and initiating 2 first-line antihypertensive medications when BP is >20/10 mm Hg above the target in stage 2 hypertension (>140/90 mm Hg).[1] However, trial data demonstrating more effective BP lowering and significantly lower risk of cardiovascular events have compelled Hypertension Canada to also recommend single-pill combinations as a first-line treatment.[3]

At Hypertension Canada, we welcome the 2017 ACC/AHA recommendation for the use of proper techniques for

office BP measurement. We similarly recommend standardized methods to diagnose and monitor BP using validated devices while auscultatory methods are less preferable. Furthermore, in line with Hypertension Canada, the new ACC/AHA guidelines strongly encourage the use of out-of-office measurements for hypertension diagnosis and monitoring that provides complementary information to standardized office BP measurement and is especially useful to rule out white coat effect and detect masked hypertension. That said, the equivalent values provided by ACC/AHA for office, home BP monitoring, and ambulatory BP monitoring need to be used cautiously because there is little specific evidence on equivalent BP levels. Hypertension Canada emphatically agrees with ACC/AHA that cardiovascular risk assessment should be a routine part of hypertension evaluation, and promotion of optimal health behaviors is the foundation of hypertension prevention and treatment. Finally, we also share the message that adults at high cardiovascular risk should be treated intensively at a systolic BP threshold of 130 mm Hg and that older adults can benefit from intensive BP targets.

Overall, Hypertension Canada applauds ACC/AHA for their efforts, and these new US guidelines send an unambiguous message about the importance of BP lowering in adults with hypertension. The differences outlined herein are possibly a result of fundamentally different philosophies in the process of guideline development. In creating guidelines, there can be a trade-off between usability and validity since clinical trial populations can differ significantly from real-world clinical populations. Our respective guideline committees balanced these competing priorities in somewhat differing ways. Hypertension Canada is highly responsive to new evidence and is strictly evidence based. For example, ours was the first guideline body to respond to the SPRINT trial and directly translate knowledge from the trial into the guidelines, maintaining the thresholds and targets evaluated in the trial and directing intensive BP lowering only to high-risk patients with a similar profile as in the SPRINT trial. ACC/AHA used a more evidence-informed approach to produce a streamlined set of thresholds and targets that represent extrapolations from evidence rather than direct translations. The ACC/AHA pragmatic approach produces easy-to-implement guidelines; however, although the new ACC/AHA guidelines are improved from the previous US guidelines, they may lead to millions of low-risk adults being labeled as having hypertension and targeted for medication intensification in the absence of clear evidence for benefit. We anticipate with great interest the changes in hypertension epidemiology, healthcare service use, and clinical outcomes that may occur south of the border as a result of these new guidelines. At Hypertension Canada, through our rigorous process, we continue to base our recommendations on strong evidence for optimal care and clinical benefits for patients with hypertension.

Disclosures

S.S. Daskalopoulou has received honoraria from Servier Canada and she as well as N.A. Khan hold unrestricted educational grants from Servier Canada. E.L. Schiffrin has held research grants from Actelion Switzerland and Servier France. R.D. Feldman has received honoraria from GlaxoSmithKline and Servier Canada. R.S. Padwal has received honoraria from Servier Canada. G. Tremblay has received honoraria from Sea Courses and Servier; he is a medical consultant for La Capitale, Service Santé Québec-Vie, Service Santé Québec-Assurance et l'union Vie, and a Continuous Professional Development Committee member of Canadian Cardiovascular Society and American Academy of Insurance Medecine.

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Hypertension. 2018;71:976-978; originally published online April 23, 2018;
doi: 10.1161/HYPERTENSIONAHA.117.10772
Hypertension is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Print ISSN: 0194-911X. Online ISSN: 1524-4563