

EDITORIAL COMMENT

Blood Pressure Targets Still Struggling for the Right Answer*



Clive Rosendorff, MD, PhD

In the early 1970s, the National Heart, Lung, and Blood Institute established the National High Blood Pressure Education Program, which was charged with providing recommendations for the diagnosis and management of hypertension. This resulted in the appearance in 1977 of the first report of the Joint National Committee (JNC) on Detection, Evaluation, and Treatment of High Blood Pressure (1), whose unwieldy title was abbreviated to JNC-1. In this report, only those individuals with a diastolic blood pressure (BP) of ≥ 120 mm Hg were recommended for prompt evaluation and treatment. We have come a long way since then, and that is in no small way due to the diligence of the authors of the successive iterations of the JNC reports, appearing at approximately 3-year intervals, to summarize and codify the evolving state of knowledge in this field.

In 2003, JNC-7 (2) established BP goals of $<140/90$ mm Hg for the general population and $<130/80$ mm Hg for patients with diabetes and/or chronic kidney disease (CKD). Soon thereafter, the JNC-8 committee was constituted, but all was not smooth sailing. The National Heart, Lung, and Blood Institute decided that it no longer wished to be in the business of guidelines, and no other organizations rushed in to provide alternative sponsorship to the previously organized writing committee. The result was that the writing committee of what was to have been JNC-8,

decided to go it alone and publish their report with recommendations anyway. This appeared in 2014 (3), 11 years after JNC-7.

The “JNC-8” panel recommendations were confined to 3 questions: the level of BP at which treatment should be initiated, the BP goal of therapy, and the selection of the appropriate drug therapy. The JNC-8 panel recommendations were claimed to be based on a systematic review of selected randomized controlled trials and, therefore, entirely “evidence-based.” However, a shadow fell between that high ideal and the reality. Of the 10 recommendations for hypertension management, only 4 were based on randomized controlled trials evidence, and the remaining 6 were based on “expert opinion.”

Be that as it may, the document is a useful and timely state-of-the-art review, and was generally received as such, with some notable exceptions. These were the decisions to abandon the lower BP target, $<130/80$ mm Hg, for those patients with diabetes and CKD in favor of $<140/90$ mm Hg, and also the recommendation to increase the target systolic BP from 140 to 150 mm Hg in persons age 60 years or older without diabetes mellitus or CKD.

The recommendation of a higher BP target for the “over-60s” contradicts the avalanche of hypertension guidelines that appeared in 2013 to 2014, including those from the European Society of Hypertension and the European Society of Cardiology (4); the American Heart Association, American College of Cardiology, and Centers for Disease Control and Prevention (5); and the American Society of Hypertension and the International Society of Hypertension (6), as well as others 1 to 2 years earlier (7,8), all of which supported a treatment goal of $<140/90$ mm Hg in all patients except, in some cases, patients older than age 80 years, where the rules were relaxed slightly. This leaves as a point of contention the huge number of hypertensive patients between the ages of 60 and 80

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From the Zena and Michael A. Wiener Cardiovascular Institute, and Marie-Josée and Henry R. Kravis Center for Cardiovascular Health, Icahn School of Medicine at Mount Sinai, New York, New York; and The James J. Peters VA Medical Center, Bronx, New York. Dr. Rosendorff has reported that he has no relationships relevant to the contents of this paper to disclose.

years, and contentious it has been. So much so that 5 members of the “JNC-8” Writing Committee took the unprecedented step of publishing a “minority report” (9), dissociating themselves from the JNC-8 panel recommendations on relaxed BP goals for those older than 60 years of age.

Authors of the minority report reminded us that it is undisputed that lowering BP improves cardiovascular outcomes, and that the JNC-8 panel had failed to identify evidence of harm of treatment to any particular target. The studies included in the JNC-8 panel recommendations, which failed to show a benefit of <140 mm Hg versus a higher goal, were underpowered to do so, and 1 study that did show benefit was excluded by the very rigorous JNC-8 panel criteria.

The main studies, which were quoted by JNC-8 to show no benefit of the lower BP goal, were the JATOS (Japanese Trial to Assess Optimal Systolic Blood Pressure in Elderly Hypertensive Patients) (10) and VALISH (Valsartan in Elderly Isolated Systolic Hypertension Study) (11). Neither included patients in the age 60 to 65 year range (JATOS age 65 to 85 years, VALISH age 70 to 84 years); JATOS had a target BP value of 140 to 159 mm Hg for the “moderate” BP control arm, different from the 140 to 150 mm Hg range of the JNC-8 panel recommendations; in both studies the observed rate of cardiovascular events was much lower than predicted, suggesting that the studies were underpowered to show benefit of a target of <140 mm Hg; and the studies were of relatively short duration (JATOS 2 years, VALISH 2.85 years). Also, both were in a Japanese cohort, which could limit the generalizability of the findings. The minority report then predicted that “the higher SBP goal in individuals aged 60 years or older may reverse the decades-long decline in CVD, especially stroke mortality” and might partially undo “the remarkable progress in reducing cardiovascular mortality in Americans older than 60 years” (9).

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We now have some quantification of that risk. In this issue of the *Journal*, Borden et al. (12) have utilized the National Cardiovascular Data Registry’s Practice Innovation and Clinical Excellence Registry as a data source to assess the potential impact of the JNC-8 panel recommendations to increase the BP targets for patients age 60 years and older, as well as those with diabetes. They did this by comparing the number of individuals, out of the total cohort of 1,118,253 patients, who were eligible for antihypertensive treatment according to the JNC-7 criteria

(BP >140/90 mm Hg, and >130/80 mm Hg for those with diabetes) versus the JNC-8 panel recommendations (BP >140/90 mm Hg for all patients <60 years of age, and >150/90 mm Hg for those older than age 60 years who do not have diabetes or CKD). The study found that 14.6% of those patients who would have been eligible for initiation or intensification of antihypertensive therapy according to the 2003 JNC-7 guideline goals would not be treated with the new JNC-8 panel recommendations. This is similar to a recent national population analysis reported by Navar-Boggan et al. (13) that estimated 15.9%.

Borden et al. (12) found that those patients for whom the recommendations had changed and who would no longer be eligible for initiation or intensification of treatment had an average 10-year risk of myocardial infarction or death of 8.5%, and when including stroke risk, of 28%. This number was estimated to be reduced to approximately 19% if those patients were treated to the JNC-7 guideline goals, equivalent to a number-needed-to-treat, for more than 10 years, of 10 to 11 patients to prevent 1 cardiovascular event. That this is not trivial is brought home by the authors’ statement: “Using these data about the patients age 60 years and older, treatment of the more than 80,000 older patients in our study population affected by the change in targets to a systolic blood pressure goal of 140 mm Hg could potentially avert approximately 8,000 cardiovascular events over 10 years” (12). On a national scale, the analysis by Navar-Boggan et al. (13) estimates that, in the United States, 13.5 million patients with hypertension who were previously eligible to be treated under the JNC-7 guideline goals would not be treated under the JNC-8 panel recommendations.

That is the unintended consequence of what is otherwise a thoughtful and useful set of recommendations from the JNC-8 Writing Committee for the management of hypertension. We do not know how practice patterns will change based on the JNC-8 panel recommendations, but it will be important to monitor these patterns; to follow BP control on a population basis, especially in those patients older than age 60 years and those with diabetes; and to follow any consequent changes in cardiovascular morbidity and mortality in these very large and growing segments of our population.

REPRINT REQUESTS AND CORRESPONDENCE: Dr. Clive Rosendorff, Medicine (111), James J. Peters VA Medical Center, 130 West Kingsbridge Road, Bronx, New York 10468. E-mail: clive.rosendorff@va.gov.

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