

FROM THE FAMILY PRACTICE INQUIRIES NETWORK

# Does lowering diastolic BP to less than 90 mm Hg decrease cardiovascular risk?

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## ■ EVIDENCE-BASED ANSWER

Although lowering diastolic blood pressure (DBP) is associated with reduced cardiovascular events, systolic blood pressure (SBP) is a more robust predictor of cardiovascular risk than DBP and should now be used to diagnose, stage, and treat hypertension.

Lowering diastolic blood pressure (DBP) to <90 mm Hg in hypertensive individuals of all ages decreases the risk of cardiovascular events including myocardial infarction (MI), heart failure, and sudden death (strength of recommendation [SOR]: **A**, based on systematic review of randomized controlled trials). However, there is no consensus regarding how far to lower DBP. A “J-shaped” increase in cardiovascular risks with DBP <85 mm Hg may apply under certain conditions.

## ■ EVIDENCE SUMMARY

The concept of a continuous graded relationship between DBP and cardiovascular risk is supported by a meta-analysis of 14 randomized clinical trials showing that lowering DBP by 6 mm Hg reduced the risk of coronary heart disease by 14% (95% confidence interval [CI], 4%–22%;  $P<.01$ ; NNT=200).<sup>1</sup> Throughout the range of DBP in study subjects, 70–115 mm Hg, a lower DBP was associated with a lower risk of coronary heart disease.

However, there is concern that lowering DBP too much may actually increase cardiovascular risk. A 10-year observational study showed that in patients with a history of ischemic heart disease, the incidence of fatal MI was lowest when DBP was between 85 to 90 mm Hg and increased with DBP <85 mm Hg, thus demonstrating a J-shaped curve.<sup>2</sup>

Farnett et al<sup>3</sup> derived a summary curve from 13 studies that stratified cardiovascular outcomes by level of achieved blood pressure; the nadir of the curve for ischemic heart disease events occurred at 86 to 89 mm Hg DBP. The risk was independent of type of drug therapy, and more pronounced in study subjects with known cardiovascular disease.

A meta-analysis of 7 randomized controlled trials involving 40,233 hypertensive patients used statistical modeling to determine the shape of the “mortality curve” over a range of DBP categories, defined in 10-mm Hg increments from 65 to 106. The subjects received mainly beta-blockers or thiazide diuretics; controls received placebo or no treatment.<sup>4</sup> Both groups demonstrated increased risk for cardiovascular and all-cause death at the lowest DBP levels. Among treated patients, overall death rate was lowest with a DBP in the range of 76 to 85 mm Hg; among controls the nadir was 86 to 95 mm Hg.

The Hypertension Optimal Treatment (HOT) trial<sup>5</sup> was specifically designed to determine the optimal target blood pressure for hypertensive patients: 18,790 men and women with DBP 100 to 115 mm Hg were randomly assigned to target DBP groups of <90, <85, or <80 mm Hg. All were treated with felodipine and other agents in a stepped-care protocol; average follow-up was 3.8 years. The lowest incidence of cardiovascular events occurred at a mean DBP of 82.6 mm Hg and fewest cardiovascular deaths at 86.5 mm Hg. Further reductions in DBP neither lowered nor increased cardiovascular risk.

A French cohort study<sup>6</sup> followed over 4700 hyper-tensive men for an average of 14 years. These men had their hypertension treated in usual fashion by their own physicians. In this group, SBP was much more accurate than DBP in classifying severity of hypertension and in predicting cardiovascular risk.

## ■ RECOMMENDATIONS FROM OTHERS

The Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC VII)<sup>7</sup> and the World Health Organization–International Society of Hyper-tension Guidelines<sup>8</sup> state that the relationship between cardiovascular risk and blood pressure is continuous, without a lower threshold. Target blood pressure goals are <140/90 mm Hg in uncomplicated hypertension and <130/80 mm Hg for individuals with diabetes or kidney disease. The National High Blood Pressure Education Program stressed that SBP, not DBP, should become the major criterion for diagnosis and treatment of hypertension.<sup>9</sup>

### CLINICAL COMMENTARY

## Emphasize education and focus on systolic blood pressure

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In light of JNC VII, there may be some confusion on the part of patients as to “normal” blood pressure and indications for treatment. In fact, on the first page of the NHLBI web

site, "Your Guide to Lowering Blood Pressure," the statement is made that "normal blood pressure is less than 120 mm Hg systolic and less than 80 mm Hg diastolic." They later go on to describe the category of prehypertension. It is important to understand the concept and implications of prehypertension, and the "J-shaped" curve in counseling our patients on achieving optimal blood pressure control.

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