

## Implications of New High Blood Pressure Guidelines for Stroke Primary and Secondary Prevention

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Since the report of the Society of Actuaries in the 1920s,<sup>1</sup> the excess disease risks of high blood pressure has been extensively studied, recognized, and documented. The linear relationship of blood pressure level and risk of stroke is evident among all adults regardless of age, sex, and race, leading to hypertension as the major global risk factor targeted for intervention.<sup>2-4</sup> The early clinical trials in the 1970s provided evidence that hypertension treatment and blood pressure reduction were associated with reduced stroke risks.<sup>5</sup> Epidemiology studies produced stroke risk estimates that were used in models to predict the impact of blood pressure reduction in the populations.<sup>6,7</sup> These estimates projected that specific reduction in blood pressures would correspond to reductions in population stroke rates (Table).

These risk estimates were shown to be valid as reductions in the distributions of population systolic blood pressures were detected from 1960 to 2008.<sup>8</sup> The greatest changes were detected for 60 to 74 year olds with median reductions from 148 to 129 mmHg and 90th percentile reductions from 188 to 156 mmHg. These lower blood pressure levels were most likely affected by hypertension treatment and management.<sup>9,10</sup> However, lower blood pressure levels were also identified in 20 to 29 year olds, suggesting that prevention and nonpharmacological strategies were effective as well.

Beginning in 1997 and continuing through 2017, the evidence from clinical trials and epidemiology studies was incorporated in a series of guidelines for detection, treatment, control, and prevention of high blood pressure.<sup>11-19</sup> With each rendition of the guidelines, refined strategies for hypertension intervention were developed by expert panels. In addition to blood pressure regimens and treatment protocols, hypertension

diagnostic procedures and algorithms are included in the recommendations. Although the reductions in stroke risks and population blood pressure distributions cannot be attributed to the recommendations from Guidelines, the implementation into practice has shown effects and impact.<sup>20,21</sup> These trends in population hypertension control and reduced stroke risks, along with the successful implementation of protocols such as demonstrated by Kaiser Permanente Northern California, would indicate the importance of maintaining intense recommendations in the guidelines. In contrast, an easing of the intensity of hypertension treatment and control may reverse the blood pressure-lowering and stroke risk reduction trends.

The reduced population stroke risk with reductions in blood pressure distributions has been proposed as the major public health achievements of the past 50 years.<sup>8</sup> As indicated, these trends are the result of the implementation of the evidence-based recommendations by healthcare providers and the adherence to the therapies by the population. It is expected that the intense recommendations of the 2017 Guidelines that builds on the evidence with new trial and study results will continue trends in the population cerebrovascular health.<sup>19,22</sup> Although these rates of stroke risk reduction and high blood pressure control are compelling, gaps in hypertension treatment and prevention remain, and it is critical to

- continue research to address the refinement of treatment protocols and the implementation;
- continue to critique recommendations and identify gaps in knowledge, behavior, and outcomes; and
- continue to form and maintain guideline panels charged with developing and enhancing evidence-based recommendations and protocols with the due diligence of the previous committees.

Still, it is important to recognize the remarkable trends in population blood pressure lowering and stroke risks reduction with the potential high impact from recommendations and the expectations with the new 2017 Guidelines.

### Disclosures

None.

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**Table. Reduction in Population Systolic Blood Pressure Distributions With Projected Stroke Mortality Reduction**

Reduction in Systolic Blood Pressure, mmHg	Stroke Mortality Reduction, %
2	-6
3	-8
5	-14

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