

Consortium for Southeastern Hypertension Control



Managing Hypertension in the Southeastern United States: Applying the Guidelines from the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI)

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ABSTRACT: The southeastern United States has the highest occurrence of heart disease and stroke and among the highest rates of congestive heart failure and renal failure in the country. The Consortium for Southeastern Hypertension Control (COSEHC) is cooperating

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with other organizations in implementing initiatives to reduce morbidity and mortality from hypertension-related conditions in the southeastern United States. This article outlines for clinicians special consideration for implementation of the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI) in the southeastern United States. Clinicians are encouraged to adapt the recommendations of JNC VI to their own patient groups, paying attention to these specific areas: (1) Ensure screening for hypertension in your practice and community. (2) Evaluate all patients for accompanying risk factors and target organ damage. (3) Promote lifestyle management for individual patients and populations for prevention and treatment of hypertension. (4) Set a goal blood pressure for each patient, and monitor progress toward that goal. (5) Recognize that many patients will be candidates for blood pressure goals of <130/85 mm Hg. (6) Pay attention to compelling and special indications such as diabetes, congestive heart failure, and renal dysfunction. (7) Consider combination therapy. (8) Maximize staff contributions to enhance patient adherence. (9) Encourage patient, family, and community activities to promote healthy lifestyles and blood pressure control. **KEY INDEXING TERMS:** Hypertension; Blood pressure; Guidelines; Southeast; Stroke belt. [Am J Med Sci 1999;318(6):357-64.]

For more than 25 years, the National High Blood Pressure Education Program has produced guidelines for the management of high blood pressure. In November 1997, the latest version of these guidelines, the Sixth Report of the Joint National Committee on the Detection, Evaluation, Prevention, and Treatment of High Blood Pressure (JNC VI), was released.¹ In the foreword to these guidelines, Dr. Claude Lenfant, Director of the National Heart, Lung, and Blood Institute, stated that "... this national guideline should serve as a tool to be adapted and implemented in local and individual situations."¹

The southeastern United States (U.S.) has the highest occurrence of heart disease and stroke and among the highest rates of congestive heart failure (CHF) and renal failure in the country.² Many reasons for these high rates have been identified, including lower socioeconomic levels, lower educational attainment, an older population, and a large number of African Americans, who experience a larger burden of the CV problem. The Consortium for Southeastern Hypertension Control (COSEHC) was established in 1993 with the goal of implementing initiatives to reduce morbidity and mortality from hypertension-related conditions in the southeastern U.S. The purpose of this article is to outline for clinicians in the southeastern U.S. the special considerations for implementation of JNC VI.

Table 1. Prevalence of Hypertension

	Southeast	Rest of U.S.
	%	
White men	27	24
White women	22	21
Black men	35	33
Black women	35	28

Source: Hall WD, Ferrario CM, Moore MA, et al. Hypertension-related morbidity and mortality in the southeastern United States. *Am J Med Sci* 1997;313:195-209.

The Southeastern Problem

Hypertension Prevalence and Control in the Southeast

High blood pressure and its sequelae are greater in the southeastern U.S. than in the rest of the nation.²⁻⁸ The National Health and Nutrition Examination Survey (NHANES) III, 1988-1991, indicates higher rates of high blood pressure for each of the 4 race-sex groups of the South compared with those of the rest of the country (Table 1). Rates of awareness, treatment, and control of high blood pressure are worse in the Southeast than in the nation (Table 2), especially for white and black men.²

Target Organ Disease

Stroke. The increased risk for stroke in the Southeast is complicated further by the fact that stroke seems to be associated with nativity (place of birth). Results of mortality data analysis in South Carolina indicate that people born in the Southeast have a significantly increased risk compared with people born outside the Southeast but now residing there.⁹ These results are supported by high rates of cardiovascular disease identified for New York residents who were born in the Southeast.¹⁰ Although the cause(s) are unknown, these findings suggest that indigenous factors are associated with excess stroke risks for the southeastern region.

Congestive Heart Failure. For the past 10 years, the annual incidence of congestive heart failure (CHF) requiring hospital admission has been increasing.¹¹ It has been estimated that 80% of CHF

cases are caused by untreated or inadequately controlled hypertension.¹¹⁻¹³

Myocardial Infarction. Although there has been a national trend toward lower coronary heart disease (CHD) mortality over the last 3 decades,¹¹ the southeastern U.S. has lagged substantially behind and now has the nation's highest CHD mortality rates.^{2,3,14-16} Survey data document higher rates of smoking, diabetes, sedentary lifestyle, and uncontrolled hypertension, suggesting possible contributors to the excess mortality. Southeast regional data are less precise, but they suggest that Southeast CHD mortality rates are the highest in the nation. Rural areas, which are prominent in the Southeast, seem to have higher heart disease death rates than urban areas of the same states.¹⁴ Perhaps the most alarming trends in heart disease death rates are observed in Mississippi, where deaths from cardiac causes are 37% more common than for the nation as a whole,¹⁷ and among African American Mississippians, cardiac death rates are actually increasing, in stark contrast to others in the state and the national trend.¹⁷

Hypertensive Renal Failure. Hypertension is the most common cause of renal failure in the southeastern U.S.¹⁸ It occurs most frequently among older people, African-Americans, and people with more severe hypertension and renal insufficiency.^{18,19} Renal failure in patients with hypertension is frequently caused by nephrosclerosis.²⁰ The most important action for slowing progressive renal failure is to lower blood pressure. All classes of drugs are effective; in most cases, multiple antihypertensive drugs may be needed.²¹

Implementing JNC VI in the Southeast

Detection and Evaluation

The higher prevalence of hypertension and its complications in the Southeast justify a meticulous and widespread approach to the detection of elevated blood pressure and its evaluation. Clinicians should follow JNC VI guidelines for detection and evaluation.¹¹ Overweight adults in the Southeast will require a large adult cuff, and obese people may require extra large or thigh cuffs. An appropriate

Table 2. Hypertension Awareness, Treatment, and Control Rates (%)

	Aware				Treated				Controlled			
	WM	WW	BM	BW	WM	WW	BM	BW	WM	WW	BM	BW
Southeast	61.8	76.4	68.6	81.2	43.8	60.1	44.3	65.3	18.5	30.1	19.3	32.3
Rest of U.S.	62.9	74.5	68.8	74.7	45.0	59.8	49.5	65.0	19.3	26.7	22.3	24.1

WM, white men; WW, white women; BM, black men; BW, black women.

Source: Hall WD, Ferrario CM, Moore MA, et al. Hypertension-related morbidity and mortality in the southeastern United States. *Am J Med Sci* 1997;313:195-209.

cuff size is one that encircles at least 80% of the arm. Mercury manometers are preferred for accurate and reproducible readings. A recently calibrated aneroid sphygmomanometer or a validated electronic device are acceptable alternatives. An average of two readings a few minutes apart is recommended.²²

Lifestyle Management for Prevention and Treatment of Hypertension in the Southeast

Compared with people in other regions of the U.S., people who live in the Southeast use more salt, are more likely to be overweight, report no leisure-time physical activity, and smoke cigarettes.^{23,24}

JNC VI describes the lifestyle changes that are often effective in reducing blood pressure and other cardiovascular risk factors and cardiovascular morbidity and mortality.¹¹ Lifestyle interventions are also useful in many patients to prevent or treat high blood pressure and as important adjuncts to pharmacotherapy in hypertensive patients requiring medications.¹¹

Weight Control. Obesity is epidemic in this country.^{25,26} Six of the top 15 states in obesity prevalence are in the southeastern U.S.¹ The prevalence of obesity in African American women in the Southeast is 71.2% higher than in other race-gender groups.²⁷

Given the epidemic of obesity in the U.S., particularly in the Southeast, a long-range, population-wide approach to reducing excess body weight and preventing the usual weight gain from ages 20 to 50 is vital to any strategy that seeks to eliminate the disparity between cardiovascular risk and outcomes in the Southeast relative to the U.S.¹ Weight loss can prevent hypertension from developing in the obese and aid in blood pressure control in patients with hypertension.¹

The evidence indicates that childhood obesity is also rising rapidly and that overweight children frequently become obese adults.²⁸ Returning physical education to the curriculum of all public schools, providing nutritious, low-fat lunches, limiting access to high-fat, calorie-dense foods on campus, including nutrition and health education, and providing incentives to limit television viewing in the curriculum from grade school through high school would help prepare the stage for healthier adult lifestyles. For example, the President's Council on Physical Fitness provided certificates to children achieving documented levels of physical fitness in the 1960s and served as a motivational tool for improving health.

Work-site health promotion programs hold great promise for producing highly cost-effective reductions of cardiovascular risk.^{29,30} The "return on investment" from a well-conceived work-site program is sufficiently high, with \$2 to \$10 in total savings for each \$1 invested to provide economic incentives for employers, employees, and their insurers. How-

ever, most of the work-site health promotion research has focused on employers of large workforces. In addition to obtaining greater implementation of work-site programs, an additional challenge will be to develop and document cost-effective work-site programs for small businesses.

Churches also provide an effective forum for successful weight management and multiple risk factor intervention.³¹ In many churches, pastors and health committees are interested in having volunteers trained to implement effective health promotion/disease prevention programs for church members and guests.

Public health messages from the 1960s to the 1980s seemed to play a very important role in several healthy changes in the U.S. population.³² Impressive and beneficial reductions occurred in the use of table salt, saturated fat, butter, eggs, and cigarettes. These lifestyle changes in the population probably played an important part in reducing mean cholesterol concentrations as well as the age-adjusted incidence of coronary heart disease in the U.S. population.³² Given the circumstances, this is a propitious time to renew focused and targeted public health messages designed to reduce the excess burden of cardiovascular disease in the southeastern U.S.

Sodium. Populations with higher levels of salt intake usually have a greater increase in blood pressure and a higher prevalence of hypertension.³³ In a combined analysis of the National Health Interview Survey for 1990 and the National Health and Nutrition Examination Survey for 1988 to 1991,³⁴ daily salt intake (as measured by 24-hour recall) was highest in the Southeast, except for black men, whose daily salt intake was lower compared with black men from other regions. However, 24-hour urinary excretion of sodium is a more accurate estimate of sodium intake than dietary recall. In 1092 untreated hypertensive male veterans, 24-hour urinary sodium excretion was significantly higher in those residing in the Southeast and in whites compared with blacks, regardless of region of residence.³⁵ The Southeast has a higher proportion of elderly and African American persons, who are more salt responsive than other groups and seem to benefit most from sodium restriction. Given the current and future demographics, a multifaceted public health approach to limiting salt intake to 2400 mg/day per JNC VI recommendations could prove more beneficial in the Southeast than in other regions of the country.

Potassium. Potassium intake and excretion have been inversely associated with blood pressure³⁶ and stroke-associated mortality.³⁷ Potassium supplementation, although not always effective, reduced blood pressure a net average of 3/2 mm Hg in a meta-analysis of 33 randomized controlled trials.³⁸ Comparative data of potassium intake by geo-

Table 3. Considerations for Individualizing Antihypertensive Drug Therapy

Indication	Drug Therapy
Compelling Indications Unless Contraindicated	
Diabetes mellitus (type 1) with proteinuria	ACEI
Heart failure	ACEI, diuretics
Isolated systolic hypertension (older patients)	Diuretics (preferred), CA (long-acting DHP)
Myocardial infarction	β -blockers (non-ISA), ACEI (with systolic dysfunction)
May Have Favorable Effects on Comorbid Conditions	
Angina	β -blockers, CA
Atrial tachycardia and fibrillation	β -blockers, CA (non-DHP)
Cyclosporine-induced hypertension (caution with the dose of cyclosporine)	CA
Diabetes mellitus (types 1 and 2) with proteinuria	ACEI (preferred), CA
Diabetes mellitus (type 2)	Low-dose diuretics
Dyslipidemia	Alpha-blockers
Essential tremor	β -blockers (non-CS)
Heart failure	Carvedilol, losartan potassium
Hyperthyroidism	β -blockers
Migraine	β -blockers (non-CS), CA (non-DHP)
Myocardial infarction	Diltiazem hydrochloride, verapamil hydrochloride
Osteoporosis	Thiazides
Preoperative hypertension	β -blockers
Prostatism (BPH)	α -blockers
Renal insufficiency (caution in renovascular hypertension and creatinine level ≥ 265.2 micromoles/L [≥ 3 mg/dL])	ACEI

ACEI, angiotensin-converting enzyme inhibitors; BPH, benign prostatic hyperplasia; CA, calcium antagonists; DHP, dihydropyridine; ISA, intrinsic sympathomimetic activity; CS, cardioselective; β -blocker, β -adrenergic receptor blocker; α -blocker, α -adrenergic receptor blocker

Adapted from JNC VI.

graphic region is limited as well; however, in the VA study, 24-hour potassium excretion tended to be lower in the Southeast ($P = 0.08$), but African Americans excreted significantly less potassium than whites ($P < 0.001$), regardless of geographic region.³⁵ Consequently, the JNC VI advice to increase potassium consumption to 90 mmol/day is especially appropriate, especially for the Southeast.

Alcohol, Calcium, Smoking, and Physical Activity. The advice and information provided in the JNC VI report are appropriate for the Southeast as well. Implementation of measures to improve these factors¹ is recommended for reducing the excess burden of disease in the Southeast.

Pharmacologic Therapy

JNC VI outlines a rational approach to drug selection based on patient characteristics. Various drug classes are recommended for the uncomplicated patient and those with compelling or specific indications. Clinicians in the Southeast should be aware that many patients will fall into the latter group. Particularly because of the high prevalence of diabetes mellitus, CHF, and renal disease, as well as demographic differences (eg, more older people, more African Americans), the JNC VI recommendations are particularly germane (Table 3). Because clinicians are more likely to encounter more severe hypertension in the Southeast, and patients will present with more co-risk factors that will be more

severe, a generally more aggressive approach to the use of drugs may be warranted.

Regional Differences in Response to Therapy

The short-term and 1-year antihypertensive efficacy of hydrochlorothiazide, atenolol, diltiazem SR, captopril, prazosin, and clonidine was compared among patients residing in the Southeast and those in other regions in a randomized controlled trial of 1105 hypertensive men from 15 U.S. VA Medical Centers.³⁵ Compared with patients living outside the Southeast, those in the Southeast achieved significantly lower 1-year diastolic blood pressure control success rates with hydrochlorothiazide (63% versus 41%), atenolol (62% versus 46%), captopril (60% versus 30%), and clonidine (69% versus 43%); there were no regional differences with diltiazem (70% versus 71%) or prazosin (54% versus 53%). When controlling for race, patients in the Southeast achieved significantly lower success rates with hydrochlorothiazide ($P = 0.003$) and clonidine ($P = 0.003$), and atenolol approached being significant ($P = 0.15$). Regardless of location, African-Americans were less likely than whites to experience treatment success with atenolol ($P = 0.02$) or prazosin ($P = 0.03$) and more likely with diltiazem ($P = 0.05$). With captopril, African Americans residing in the Southeast tended to have lower success than other race-region groups ($P = 0.07$). These relatively short-term data suggest that hypertensive patients

from the southeastern U.S. may be less responsive to several antihypertensive drugs.

Prescribing. Neither age nor gender should negatively affect the use of pharmacological intervention. In older patients, the treatment of hypertension has been associated with an even more significant reduction of cardiovascular-renal diseases.³⁹ Recent concluded studies⁴⁰ demonstrate the safety and efficacy of reducing blood pressure to levels near physiological levels.

Medications should be prescribed in ways that enhance potential long-term adherence. In general, the lowest dose of antihypertensive drugs should be used initially. The majority of blood pressure reduction of any antihypertensive agent occurs within 24 hours of the first dose, although additional antihypertensive effect may be seen after several weeks of therapy. For new patients with uncontrolled stage 1 or 2 hypertension, return visits within 1 month are reasonable to monitor response and provide feedback. For patients with stage 2 or 3 hypertension, more frequent visits are often used. Upward titration of antihypertensive medications should be undertaken only after standing blood pressures have been carefully measured and after assurance that the patient has taken the medication the day of the exam. Single medications with once-a-day dosing are preferred in order to enhance compliance. Efforts should be made to avoid dosing more than twice a day.¹ Clinicians in the Southeast need to be prepared to use combination therapy in many patients.

Improving Adherence and Control Rates in the Southeast

Knowing the patient as an individual, listening to the patient's concerns about the nuances of the therapy, setting a goal blood pressure, and including the patient in decision-making about therapy are important steps to improve blood pressure control rates. Thorough explanations of side effects, real and imaginary, are important for the patient's acceptance of the treatment modality. Careful listening by the physician and the treatment team members can identify patient misperceptions.

Long-term hypertension control requires the management team to consider a number of factors including: office access and organization; patient and provider education; dosing and efficacy of antihypertensive drugs; cost of care including medications; and avoidance of treatment side effects. Actively involving the patient's family members and using available community resources will also contribute to increased adherence. Patients, particularly those who have missed several appointments, should be contacted by telephone or mail to assess barriers to care.

Table 4. Keys to a Successful Blood Pressure Office Visit

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- Tell patients their blood pressure readings in numbers and whether the readings are at the goal level.
 - Determine if the patient can read, or in the case of the elderly or diabetic patients, if he can see well enough to read the list. If not, then a morning sun and evening moon chart with sample pills attached at appropriate times of day should be made.
 - Review medications and provide a written list with any medication changes using bold, easily read lettering.
 - For patients with poor sight, a friend or neighbor should be sought to assist with medications.
 - A patient with well-controlled hypertension should be specifically told that his blood pressure is well controlled because he has been following the care plan, taking his medications, and that he should continue the same therapy.
 - All medication prescriptions should be checked for adequate number of refills.
 - Review recent laboratory results with the patient. This is a good time to reassess other cardiovascular risk factors such as lipids, smoking, etc., and to make appropriate recommendations.
 - Tell the patient when to return, and make a specific return appointment before he leaves the clinic. Asking patients to call back in 3 to 6 months promotes infrequent return visits.
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Office Organization

The office should operate during times convenient to patients. Because of work or family situations, the best hours of service for patients may require the office or clinic to be open some evening or weekend hours.

The office should have established policies regarding making patient appointments, including sending reminders of clinic appointments by using postcards or telephone contacts. Follow-up appointments should be made before the patient leaves the clinic. An appointment card with the date and time of the next scheduled visit should be given to the patient as a reminder. Office staff should be trained in the use of computers for patient tracking. Multidisciplinary teams should be developed, with all staff trained in how best to deliver courteous, efficient, and convenient service to all patients.

The Office Visit. Patients should be asked to bring all of their medications (including over-the-counter, nonprescription medications) to the office or clinic. Discrepancies may be found between how medications are prescribed and how the patient is actually taking the medicines, and potential drug-drug interactions may be identified. A review of when the patient last took medication will help interpret the blood pressure readings for the visit. Table 4 provides some hints for the office visit.

At each visit, providers should ask patients how they are taking care of themselves and their blood pressure. Specifically, they should inquire about the 4 critical patient behaviors for long-term adherence to blood pressure therapy. These include: (1) making a decision to control blood pressure; (2) following treatment recommendations (lifestyle and medica-

tion); (3) monitoring progress toward goal blood pressure; and (4) resolving problems that can block control of hypertension.

Preventing/Minimizing Side Effects

Minimizing medication side effects will increase the likelihood that a medication will be taken regularly. It is helpful to explain to patients the expected antihypertensive drug effects versus effects that might be interpreted as side effects. It is important to elicit reports of side effects at each follow-up visit. If one is reported, spend time discussing it with the patient. Many signs and symptoms reported by hypertensive patients are not necessarily side effects related to their antihypertensive agent. However, once a side effect is reported, no matter how trivial, the potentially offending drug usually should be changed or the dose reduced and another agent added, because it is unlikely that the patient will continue taking the drug and may even decide not to return to care if an alternative medication is not prescribed.

Patient Education

Effective communication between the provider and the patient is particularly important in hypertension management, because the patient is asked to make one or more lifestyle modifications after many years of habit, pay significant amounts for care and medications, take daily medication, and perhaps experience medication side effects. Unless patients are convinced that they are at personal risk from their uncontrolled high blood pressure and that the prescribed treatment will reduce that risk, long-term hypertension control will not be optimal. The office staff can be effective in patient education and in re-enforcing what the provider has recommended.

Achieving effective provider-patient communication requires an appropriate place and an empathetic provider with an ability to speak the patient's language. Language compatibility is more than using Spanish with a Hispanic-American patient. Effective communication requires understanding the patient's usual lifestyle, education level, colloquial language, and ethnic and cultural background. Local cultural knowledge is particularly important for diet and physical activity information. Reading materials must be appropriate to the patient's reading skill level.

In the formulation of a treatment plan, it can be helpful to ask patients what they think would be helpful and how they think their blood pressure can be controlled. If they agree to make a jointly developed treatment plan, this can be the basis for a verbal or written contract with the provider. The making of a contract between the therapist and patient adds some formality; more importantly, however, it requires the patient and provider to reach mutually agreed-upon goals and strategies

and to verbally agree to the contract's terms. If the patient or provider cannot agree to the suggested contract, then the treatment plan should be modified. Asking a patient to commit to too many simultaneous lifestyle modifications can be a deal breaker. At best, a few modifications at a time should be sought. All contracts should be worded in behavioral terms with measurable goals, including a specified time for achievement. An example of such a contract might read: "I will lose 3 pounds before my visit next month. I will measure and record my blood pressure at home 3 times a week and will bring the readings to my next visit. If my home blood pressure is >160/100, I will call the office for assistance."

Cost of Care: The Clinic Visit

The cost of medical care can be a barrier to patients remaining in continuous care for high blood pressure, particularly for older patients who are often on fixed incomes and patients without any pharmacy assistance plan. Total annual clinic visit costs can be lowered by reducing frequency of visits to physicians and by increasing the roles of nurses and other office staff. Collaborating with a work-site program or a public health management program can also reduce cost. For some patients, home blood pressure monitoring with periodic professional review can reduce the frequency of clinic visits and cost. However, home blood pressure monitoring should be validated and patients should be taught correct measurement techniques. Once a goal blood pressure has been reached, hypertension control continues. Efforts should be made to monitor weight gain, excessive sodium intake, medications that interfere with antihypertensive agents, or development of renal failure or renal artery stenosis.

The other major cost for hypertension management is medications. The newer antihypertensive medications tend to be more expensive. Fixed combinations of antihypertensive agents were recommended by JNC VI as potential first-step drugs to simplify treatment, to reduce individual drug side effects, and to reduce costs.¹

The medication(s) dosage and dosing schedule should be selected to minimize patients' medication cost. For patients who do not have insurance prescription plans, prescribing in lots of 100 tablets is usually less expensive than smaller numbers. Enough refills should be given to cover the interval until the next visit. For prescription plan patients, it may be less expensive to buy the drug once in a lot of 100 tablets rather than to buy the drug 3 times in lots of 30 tablets. For example, 100 tablets of hydrochlorothiazide, a 3-month supply, can usually be bought for less than \$6 if bought at one time. If a patient has a copay of \$3 for a 30-day generic refill, the patient would save more than \$3 on the 3-month supply.

Summary and Conclusion

Hypertension and resulting CVD are more common in the Southeast than in other regions. Special considerations need to be given to prevention and control of hypertension and CVD. Clinicians are especially encouraged to adapt the recommendations of JNC VI to their own patient groups, paying attention to these specific areas: (1) ensure screening for hypertension in the practice and community; (2) evaluate all patients for accompanying risk factors and target organ damage; (3) promote lifestyle management for individuals and populations for prevention and treatment of hypertension (especially weight, sodium, and potassium); (4) set a goal blood pressure for each patient and monitor progress toward that goal; (5) Recognize that many patients will be candidates for blood pressure goals of <130/85 mm Hg; (6) pay attention to compelling and special indications, because many patients in this region have diabetes, CHF, and renal dysfunction; (7) consider combination therapy (especially with low-dose diuretics), because many patients will require multiple agents to achieve control; (8) arrange your practice to maximize staff contributions to enhance patient adherence, paying attention to patient education, costs, and systems for patient convenience; (9) encourage patient, family, and community activities to promote healthy lifestyles and blood pressure control.

Acknowledgments

COSEHC believes that this report is one more step in the National Heart, Lung, and Blood Institute's activities to address the regional and racial variation in CVD outcomes. We are delighted that the following organizations are also engaged in the effort: The American Heart Association, the Association of Black Cardiologists, the International Society on Hypertension in Blacks, and the Southern Medical Association. Other organizations and societies are invited to join us in addressing this important public health problem. We hope this effort will be effective in reducing the gap in knowledge and practice in the management of hypertension and cardiovascular disease.

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