# GUIDELINES FOR MANAGEMENT OF HIGH-RISK AFRICAN AMERICANS WITH MULTIPLE CARDIOVASCULAR RISK FACTORS: RECOMMENDATIONS OF AN EXPERT CONSENSUS PANEL

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African Americans have higher rates of cardiovascular disease (CVD) than do Caucasians, which contributes significantly to their reduced life expectancy. Most African American adults have at least one major risk factor for CVD. Nonetheless, African Americans are often underdiagnosed and undertreated, despite presenting to the healthcare system late in their course, often after a CVD event. Patients with multiple risk factors have a CVD risk far greater than the sum of their individual risks. Metabolic syndrome tends to be clustered to a greater degree in African American women. Aggressive management of African Americans is necessary.

In this report, we provide guidelines for the management of high-risk African Americans. For each individual risk factor, we address existing data and guidelines in the general population, existing data in African Americans, and proposed guidelines for African Americans based on evidence or extrapolation. In particular, for elevated cholesterol and blood pressure, evidence is emerging that lower is better, so aggressive management strategies are necessary. For dyslipidemia, statins alone will generally reach the goal, but for hypertension, multiple drugs are usually necessary. We conclude that further research in African Americans is necessary to complete the totality of evidence. (*Ethn Dis*. 2007;17:214–220)

**Key Words:** African American, Cardiovascular Disease, Multiple Risk Factors

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## INTRODUCTION

Cardiovascular disease (CVD) is and will remain the leading killer in the United States despite remarkable declines in mortality during the latter part of the 20th century.[1] Among the 35 million African Americans (12.3% of the US population), the average life expectancy is ≈69 years vs 76 in the general population (65.0 vs 73.2 in men and 73.9 vs 79.8 in women).[2] Cardiovascular disease (CVD) is a major contributor to this disparity, which has persisted unchanged during the 20th century.[3] In 1995, age-standardized death rates from CVD were ≈40% higher in African Americans (154 per 100,000) than in Caucasians (114 per 100,000).

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African Americans have higher levels of individual risk factors, most notably smoking but also obesity, hypertension, and diabetes mellitus. African American multiple risk factor patients (AAMRP) often are underdiagnosed and undertreated, and they present to the healthcare system late in their course, often after a CVD event.

In this report, we provide guidelines for management of the AAMRP. The individual characteristics contributing to the diagnosis of the AAMRP are identified (Table 1), as well as other criteria (Table 2).[4] For each individual risk factor, we address five issues: 1) existing data in the general population; 2) existing guidelines for the general population; 3) existing data on African Americans; and 4) proposed guidelines for African Americans, whether based on evidence or extrapolation. We conclude that further research in African Americans is necessary to complete the totality of evidence.

## ESTABLISHED RISK FACTORS

### Hypertension

Hypertension affects >50 million people (20% of the US population) and increases risk of stroke, myocardial infarction, and CVD death. The costs are estimated to be >$23 billion in medicines, health services, and loss of productivity.[5] The Seventh Joint National Committee (JNC 7) Report on Prevention, Evaluation, and Treatment of High Blood Pressure[6] estimates that 27% of treated hypertensives are at goal, and this ratio is lower in African Americans.

In the third National Health and Nutrition Evaluation Survey, the prevalences of hypertension in African American men and women were 35% and 34.2%, respectively, compared to 24.4% and 19.3% in Caucasians.[7] Death rates from hypertension are >350% higher in African Americans than in Caucasians.[8] African Americans have earlier onset, higher prevalence, and greater severity

**Table 1. Common characteristics of African American multiple risk patients (AAMRP)**

| |
|---|
| Systolic blood pressure ≥130 mm Hg and/or diastolic blood pressure ≥85 mm Hg |
| Left ventricular hypertrophy |
| Family history of type 2 diabetes mellitus |
| History of gestational diabetes mellitus |
| Birth of infant >9 lbs |
| Fasting plasma glucose concentration 110 to 125 mg/dL (6.1 to 6.9 mmol/L) |
| Serum triglyceride concentrations ≥150 mg/dL (≥1.69 mmol/L) |
| Serum low-density lipoprotein cholesterol >140 mg/dL (>3.62 mmol/L) |
| Serum high-density lipoprotein cholesterol <40 mg/dL (<1.03 mmol/L) in men |
| Central (abdominal, visceral) obesity |
| Waist:hip ratio >.8 in women, >.95 in men |
| Body mass index >27 kg/m$^2$ |
| Cigarette smoking |
| Serum homocysteine >15 µmol/L |
| Serum plasminogen activator inhibitor-1 >15 IU/L |
| History of clot formation |
| Polycystic ovary syndrome |
| Acanthosis nigricans |
| Gout or serum uric acid >8.5 mg/dL (>.51 mmol/L) |

of hypertension, with double the risk of heart failure and CHD, and a five-fold increased risk of fatal stroke and end-stage renal disease (ESRD).[9,10]

The Jackson Heart Study is a prospective cohort study of African Americans to identify risk factors for CVD, with emphasis on sequelae of hypertension (left ventricular hypertrophy [LVH], heart failure, CHD, stroke, and renovascular disease).[11]

Left ventricular hypertrophy (LVH) is an independent risk factor for sudden cardiac death[12] and usually a consequence of hypertension. In the Framingham Heart Study, patients with LVH had a five to six times higher risk of sudden death.[12] Left ventricular hypertrophy (LVH) is more common in African Americans and increases risks of arrhythmias and silent but lethal ischemic events.[13]

## Diabetes Mellitus

Diabetes mellitus affects 10.3 million Americans, and another 5.4 million are undiagnosed. It is the fourth leading cause of death in African Americans, compared with seventh for the general population. The American Diabetes Association estimates that 2.8 million African Americans (13%) have diabetes, predominantly type 2.[14] In middle age (45–64 years), African Americans have a 51% higher prevalence of type 2 diabetes than do Caucasians. Age-adjusted death rates in diabetes were higher for African American men (117%) and women (167% ) than for Caucasians.

Impaired fasting glucose is a precursor to diabetes, characterized by levels between 110 to 126 mg/dL (6.1 to 7.0 mmol/L) (Table 1). The prevalence in African Americans is 7.0%.[15] Approximately 50% to 60% of individuals with impaired fasting glucose also have impaired glucose tolerance.

**Table 2. Suggested approach to identification* of the insulin resistance syndrome**

| Category | System | Abnormal If Any of These Criteria Are Met |
|---|---|---|
| 1 | Body weight/fat distribution | Body weight ≥120% of ideal adjusted for height, frame, sex<br>Body mass index (BMI, kg/m$^2$) ≥27.8 (men) or ≥27.3 (women)<br>Waist:hip ratio ≥.95 (men) or ≥.85 (women) |
| 2 | Blood pressure | Systolic ≥130 mm Hg, diastolic ≥85 mm Hg |
| 3 | Glucose tolerance† | Impaired fasting plasma glucose indicated by plasma glucose 110–126 mg/dL (6.1 to 7.0 mmol/L in asymptomatic person (person could have diabetes if ≥126 mg/dL [≥7.0 mmol/L])<br>Impaired glucose tolerance indicated by plasma glucose 2-hour post oral glucose challenge 140–199 mg/dL (7.8 to 11.0 mmol/L) in asymptomatic person (person could have diabetes if ≥200 mg/dL [≥11.1 mmol/L]) |
| 4 | Lipids | Fasting serum triglycerides >150 mg/dL (>1.69 mmol/L)<br>High-density lipoprotein cholesterol <40 mg/dL (<1.03 mmol/L) |
| 5 | Family history | Positive history of type 2 diabetes mellitus or premature cardiovascular disease in first-degree relative |

* A patient who satisfies criteria for abnormalities in at least two of the five categories is likely to be insulin resistant and may have insulin resistance syndrome.

† See reference 4.

## Dyslipidemia

Statins significantly lower total cholesterol, low-density lipoprotein (LDL) cholesterol, and triglycerides as well as increase high-density lipoprotein (HDL) cholesterol. In large-scale randomized trials, statins significantly reduce risks of myocardial infarction, stroke, cardiovascular mortality, and total mortality.[16–21] In the National Cholesterol Education Program III, the primary target is LDL cholesterol. Secondary targets include HDL cholesterol and triglycerides. Recently, these guidelines have been updated to lower targets on the basis of randomized trials that show greater benefits of higher dose of statins compared with usual dose.[22]

## Obesity

Approximately 97 million adults in the United States are obese or overweight.[23] Obesity leads to diabetes, hypertension, and dyslipidemia. Abdominal (central) obesity is particularly associated with insulin resistance and is more atherogenic than gluteofemoral obesity.

African American women have double the rate of abdominal obesity than

Caucasians (Figure 1).[24] Abdominal obesity is assessed by the waist:hip ratio or waist circumference (Table 3).[23] In randomized trials of weight loss of short duration, psychological benefits include improved quality of life, feeling better, looking better, and having more energy. Further research is needed in African American women, including randomized trials of longer duration testing the benefits and risks of newer pharmacologic therapies for obesity.

## Physical Inactivity

Physical inactivity is an independent risk factor for CVD. Individuals who increase their level of physical activity to modest frequency and low intensity experience significant reductions in risks of CVD.[25]

## Cigarette Smoking

Cigarette smoking is the leading avoidable cause of premature cancer and total deaths in the United States.[26] Current smokers have double the risk of CVD mortality compared with nonsmokers, and cessation yields benefits that equate to those of the nonsmoker within a few years. Beneficial changes begin within months, even in the elderly.[27]

African American men smoke more than Caucasians but consume fewer cigarettes per day. African American and Caucasian women smoke at approximately equal rates.[28,29]

# RECOMMENDATIONS FOR MANAGEMENT OF THE AAMRP

## Therapeutic Lifestyle Changes

Therapeutic lifestyle changes confer large and more than additive CVD benefits. As regards dietary changes, recommendations include saturated fat <7% of total calories, cholesterol <200 mg/d, plant stanols and sterols, and foods with viscous (soluble) fiber.[30] Dietary advice includes distribution of meals evenly throughout the day, avoidance of "unconscious" eating, and reduction of daily intake by 200 to 500 calories to achieve modest weight loss. Patients should be followed for compliance and weight loss.

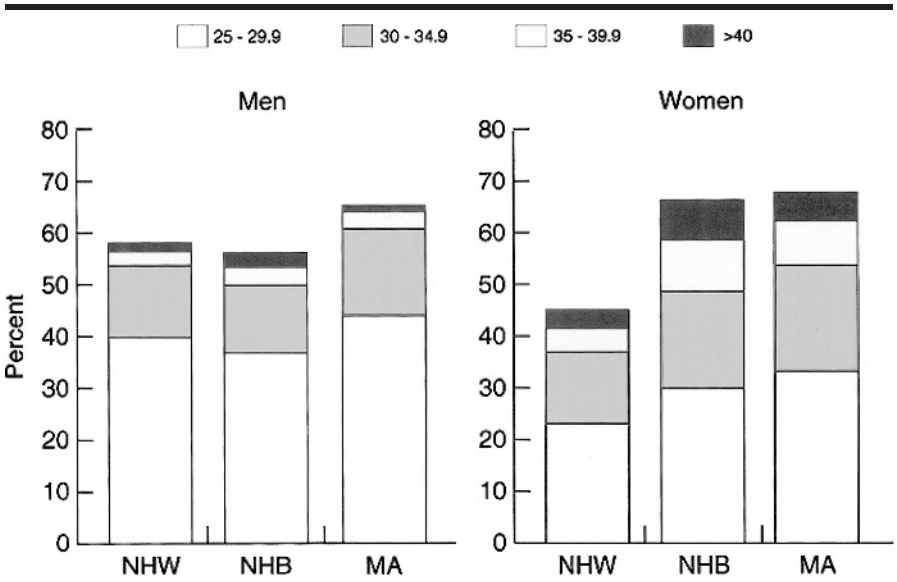


**Fig 1. Prevalence of overweight body mass index (BMI/kg/m$^2$) in US by sex and ethnicity, 1988–1994. MA=Mexican American; NHB=non-Hispanic Black; NHW=non-Hispanic White. Three levels of obesity: Class I BMI=30–34.9; Class II BMI=35–39.9; Class III BMI≥40 (Data derived from Reference 24, p 44, Table 6)**

## Hypertension

African American patients present at younger ages, with higher blood pressure levels and greater target organ damage (eg, LVH, reduced renal function). Current JNC 7 guidelines[6] are based largely on Caucasian populations, although racial and ethnic minorities are discussed. Recently, guidelines for African Americans[31] include:

- Combination therapy
- Target blood pressure of 130/80 mm Hg for those with heart disease, diabetes, or kidney disorders
- Include angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers in combination therapy for patients with diabetes or renal disease

Randomized trials indicate that pharmacologic treatment of systolic blood pressures >140 mm Hg or diastolic pressures >90 mm Hg yield 4- to 6 mm Hg reductions. Over three to five years, these reductions produce

**Table 3. Disease risk relative to normal weight and waist size[23]**

| | | | Disease Risk by Waist Size | |
|---|---|---|---|---|
| | | | Men ≤102 cm (≤40 in.) | Men >102 cm (>40 in.) |
| Weight | BMI (kg/m$^2$) | Obesity Class | Women ≤88 cm (≤35 in.) | Women >88 cm (>35 in.) |
| Underweight | <18.5 | | | |
| Normal | 18.5–24.9 | | | |
| Overweight | 25.0–29.9 | | Increased | High |
| Obesity | 30.0–34.9 | I | High | Very high |
| | 35.0–39.9 | II | Very high | Very high |
| Extreme obesity | >40 | III | Extremely high | Extremely high |

BMI=body mass index.

**Table 4. Strategies for reducing insulin resistance**

| | |
|---|---|
| **Nonpharmacologic** | American Heart Association Step 1 or 2 diet |
| | Weight loss through hypocaloric diet (↓ initial body weight by 10% to 15% and maintain) |
| | Regular exercise (30 minutes of modest aerobic exercise at least 3 or 4 days/week, aim for 70% maximum heart rate) |
| | Smoking cessation |
| | Counseling |
| **Pharmacologic** | Hyperlipidemia (aim for total cholesterol ≤200 mg/dL [≤5.17 mmol/L], LDL-C ≤ 130 mg/dL [≤3.36 mmol/L]*, and HDL-C >35 mg/dL [>0.91 mmol/L] in men or >45 mg/dL [>1.16 mmol/L] in women) |
| | Elevated LDL-C: statin, resin, niacin |
| | Elevated triglycerides: gemfibrozil, fenofibrate, niacin |
| | Elevated LDL-C and triglycerides: statin and fibric acid derivative, resin, niacin, or high-dose statin |
| | Hypertension (aim for blood pressure ≤130/85 mm Hg) |
| | ACE inhibitors, $\alpha_1$-receptor blockers, calcium channel blockers, angiotensin II receptor antagonists |
| | Consider aspirin 81–325 mg/d |
| | Consider vitamin E 400 IU/d |
| | Insulin-sensitizing drugs: theoretical but unproven benefit as primary therapy for insulin resistance, except to treat hyperglycemia |

* LDL-C goal is <100 mg/dL (<2.59 mmol/L) in patients with coronary artery disease, peripheral vascular disease, or stroke.

ACE=angiotensin-converting enzyme; HDL-C=high-density lipoprotein cholesterol; LDL-C=low-density lipoprotein cholesterol.

lower risks of stroke (42%), vascular death (20%), and CHD (14%).[32] Drug selection should be governed by compelling indications, contraindications, and clinical judgment. Nonpharmacologic treatment (eg, weight loss, salt restriction) and drug therapy of patients' high-normal elevated diastolic blood pressure (85 to 89 mm Hg) reduces the rate of development of hypertension.

Racial differences practically disappear in combination therapies that most patients need to achieve blood pressure control. ACE inhibitors are the first choice in patients with metabolic syndrome or diabetes.[33] Indeed, ACE inhibitors and angiotensin receptor blockers affect the renin-angiotensin system and provide target-organ protection superior to other agents, even when blood pressure lowering is similar.[34–38] Some data suggest that African Americans may have a less beneficial response to ACE inhibition. Nonetheless, ACE inhibitors have beneficial effects on kidney function and CHF. In multidrug regimens, virtually no difference in blood pressure lowering is seen in initial therapy with an ACE inhibitor or calcium blocker.[38] In the African American Study of Kidney Disease and Hypertension trial, ramipril produced a 36% slower mean decline in glomerular filtration rates over three years and a 38% reduction in the risk of renal clinical endpoints among African Americans with hypertensive renal disease.[38]

## Glucose Intolerance/ Diabetes Mellitus

The American Diabetes Association Standards of Care[39] outlines management of glucose intolerance and addresses criteria for screening obese African Americans. Randomized trials in patients with type 1[40] or type 2[41] diabetes indicate beneficial effects of lifestyle modifications, such as weight loss and exercise, as well as aspirin, ACE inhibitors, and a variety of hypoglycemic agents (Table 4). In patients with type 2 diabetes, sulfonylurea or insulin therapy significantly reduced the risk of microvascular complications (eg, retinopathy, nephropathy) by 25%.[41]

## Dyslipidemia

Lowering LDL cholesterol to <100 mg/dL (<2.59 mmol/L), with an optimal goal of <70 mg/dL, is the target for patients with prior myocardial infarction or stroke, peripheral vascular disease, 10-year CHD risk ≥20% or higher, or diabetes. For patients between 10% and 19%, the LDL cholesterol goal is <130 mg/dL (<3.36 mmol/L) with an optimal goal of <100 mg/dL. For individuals whose 10-year CHD risk is <10%, the LDL cholesterol goal is <160 mg/dL (<4.14 mmol/L). These 10-year risks are based on Framingham risk scores from a primarily Caucasian population. African Americans have higher absolute risks for any given Framingham risk score.

## Obesity

The US National Heart, Lung and Blood Institute guidelines for clinicians include dietary therapy, physical activity, drug therapy, and if needed, obesity surgery (Figure 2).[23] All individuals should have body mass index (BMI) and obesity-related disease risks assessed and routinely monitored. For overweight patients (Table 3), weight maintenance may suffice if the patient has no additional risk factors and is resistant to weight reduction. Weight reduction is indicated if patients are obese (BMI >30 kg/m$^2$) and especially with risk factors and increasing severity of obesity. Recommended dietary changes for all patients whose BMI is >25 kg/m$^2$ include caloric restriction and adherence to the US Department of Agriculture's food pyramid guidelines that call for increased intake of fruits, vegetables, and grains.

## Physical Inactivity

Low to moderate physical activity, defined as a 20-minute walk every other day, is associated with a 35% to 55% decrease in CVD in women, predominantly Caucasian.[25] Regular physical activity well into old age can be achieved if focused on an enjoyable activity, such

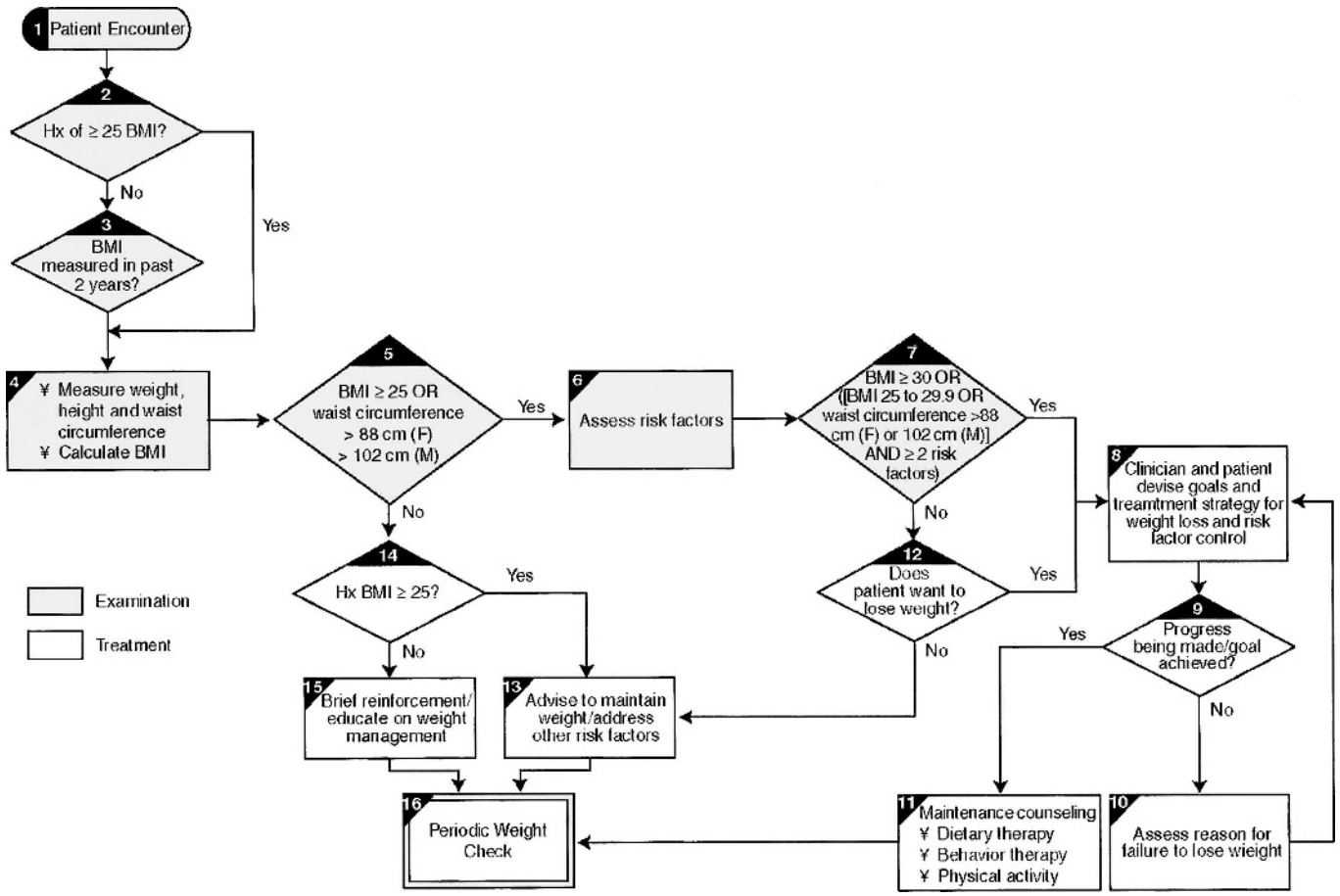


**Fig 2. Treatment algorithm developed by the National Heart, Lung, and Blood Institute (1998) for overweight and obesity. Initial overall assessments for other conditions and diseases are not reflected. Boxes 1–7, examination; Boxes 8–15 treatment[23]**

as dancing, gardening, or dog walking, performed for sufficient duration on a regular basis.[31]

## Cigarette Smoking

Smoking cessation has a 50% to 70% success rate for patients hospitalized with CHD. African Americans, have lower rates of quitting.[42] Further research is needed to determine whether nicotine intake, biological factors, or possibly the preference for mentholated cigarettes affects nicotine dependence and ability to abstain.[43]

Smoking in African Americans should be considered an addictive behavior, and younger men and women, especially pregnant women, should be targeted. Outreach through community or church-based programs that offer individual counseling and culturally appropriate self-help materials may be effective.

## CONCLUSION

In the United States, African Americans have significantly higher risks of CVD than do Caucasians. Most middle-aged African Americans have at least one risk factor, many of which contribute to metabolic syndrome. Most are identifiable and modifiable even in early life.

Innovative approaches are necessary to improve compliance with therapeutic lifestyle changes.[44] For the general population, dropout rates for most physical activity programs are 50% within three to six months. Even cardiac rehabilitation patients, regardless of severity of the illness, dropout at a rate of 50% within a year. Group cohesion and social support are important to decrease dropout rates.[45]

*Informal care in nontraditional settings, as well as alternative and complementary medicine, may be more a culturally acceptable and cost-effective means to maintain and promote health for African Americans…*

Informal care in nontraditional settings, as well as alternative and complementary medicine, may be a more culturally acceptable and cost-effective means to maintain and promote health for African Americans, effectively overcoming barriers to accessing traditional care (financial, transportation, organizational and linguistic barriers) and offering ongoing education and support.[46]

Cultural differences between patients and providers may affect adherence and outcomes. Cultural competence requires provider sensitivity to African American communication methods, belief systems, and the impact of their culture on healthcare relationships.[47]

In addition to therapeutic lifestyle changes, drug therapies of proven benefit should also be used. For dyslipidemia and hypertension, lower is better, so aggressive management strategies for high-risk AAMRP would be beneficial. While for dyslipidemia, statins alone will generally reach the goal, for hypertension multidrug therapies are usually necessary.

Efforts are needed to increase the number of trained minority health professionals and to improve cross-cultural interaction skills of all healthcare providers. Most African Americans are not treated by African American healthcare professionals. The following four steps outline ethnic-sensitive services[46]:

1) Develop access to services (bilingual, bicultural staff)
2) Learn others' culture to tailor interventions
3) Modify services (integrate traditional medicine with formal Westernized medicine)
4) Initiate an appropriate organization development model/specialized program model (example: faith-based health care delivery model)

The current reimbursement environment does not facilitate issues of diagnosis, treatment, and overall access to health care for many African Americans. This is likely to be a factor in the disparities between African Americans and Caucasians. Healthcare providers have an urgent challenge to diagnose and aggressively manage the AAMRP, on the basis of the best clinical information available. Further research is needed to acquire a sufficient totality of evidence to achieve evidence-based changes in public health policy.

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*Design concept of study:* Williams, Flack, Gavin, Hennekens
*Acquisition of data:* Williams, Schneider, Hennekens
*Data analysis and interpretation:* Williams, Flack, Gavin, Hennekens
*Manuscript draft:* Williams, Flack, Gavin, Schneider, Hennekens
*Statistical expertise:* Hennekens
*Acquisition of funding:* Williams
*Administrative, technical, or material assistance:* Williams, Flack, Gavin, Schneider, Hennekens
*Supervision:* Williams, Hennekens

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