Recent Advances in Preventive Cardiology and Lifestyle Medicine

Behavioral Strategies for Cardiovascular Risk Reduction in Diverse and Underserved Racial/Ethnic Groups

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Cardiovascular disease (CVD) is the leading cause of death and disability in the United States across all racial/ethnic groups. Much of the burden of CVD morbidity and mortality is associated with modifiable lifestyle risk factors. A disproportionate share of the burden of CVD and metabolic/vascular risk factors falls on racial and ethnic communities as a result of a constellation of social, environmental, biological, and systems factors. Disparities are most clearly evident for black compared with white Americans. Available data for other racial/ethnic minority populations indicate disparities for certain CVD risk factors or outcomes.

Despite widespread awareness among clinicians of primary and secondary CVD prevention goals and the potential for improving clinical outcomes by integrating lifestyle risk reduction interventions into practice, the application of these interventions is far from optimal. Therapeutic goals for primary and secondary prevention have been well established over the last 3 decades. Table 1, derived from the American Heart Association (AHA) scientific statements on primordial, primary, and secondary risk reduction and diet and lifestyle recommendations, delineates targeted goals and risk reduction strategies across the spectrum of prevention. Primary prevention seeks to avoid a first occurrence of CVD among individuals at risk through smoking cessation; management of blood pressure (BP), lipids, and glucose; weight control; and dietary and physical activity counseling. Secondary prevention aims for intensive and comprehensive management of risk factors in those with established CVD and is associated with improved survival and a reduction in recurrent events. Secondary prevention benchmarks for lipid management are lower than for primary prevention, but BP, smoking, dietary, and physical activity goals are the same. As a result of a growing recognition that subclinical disease develops over many years and with various levels of risk, the necessity to broaden the focus of CVD prevention to include primordial prevention, the avoidance of adverse levels of risk factors in the first place, is now recognized. Including primordial prevention in the risk reduction paradigm necessitates promoting health behaviors that have been associated with decreased CVD morbidity across the lifespan and with a population focus.

The need for effective prevention strategies is especially urgent for racial/ethnic minority communities in which the prevalence of risk factors is high and control of these risk factors remains low. This review examines evidence-based strategies to facilitate integration of established lifestyle risk reduction interventions in diverse and underserved racial/ethnic groups and offers practical approaches to achieve primary and secondary prevention in these populations. By focusing on behavioral strategies that target the individual and that can be implemented by the clinician at the point of service, we have, by definition, limited the scope of this article. Effective, broad-based policies that affect tobacco control, nutrition, physical activity, and access to care and strategies to increase guideline concordant delivery of pharmacological and interventional cardiovascular care combined with clinician-delivered, individual-based behavioral interventions are important; however, a thorough examination of the impact of these policies is beyond the scope of this article.

This article provides a brief overview of the disparities in CVD health status, lifestyle risk factors, and health care. Successful CVD risk reduction strategies targeted to lifestyle behaviors are then described with a focus on research that demonstrates benefit in racial/ethnic minorities. General issues related to cultural competence and cultural tailoring are also discussed.

Background

Racial/Ethnic Minority Populations

US health statistics typically use categories based on race (African American or black, white, American Indian/Alaska Native [AI/AN], Asian Americans, and Native Hawaiians and other Pacific Islanders) and separate people who report Hispanic ethnicity from those who do not (eg, Mexican American or Hispanic versus non-Hispanic black and non-
### Table 1. Established Metrics and Strategies for Prevention of Cardiovascular Disease in Adults

<table>
<thead>
<tr>
<th>Targeted Risk Factor</th>
<th>Ideal CV Health Definition</th>
<th>Primary Prevention Goals</th>
<th>Secondary Prevention Goals</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>Never or quit &gt;12 mo ago</td>
<td>Complete cessation; no exposure to environmental tobacco smoke</td>
<td>Complete cessation; no exposure to environmental tobacco smoke</td>
<td>Ask about tobacco use at every visit. Advise every tobacco user to quit. Assess the smoker’s willingness to quit. Assist the smoker in making a plan for quitting and provide counseling. Arrange follow-up, referral, and/or pharmacotherapy. Urge avoidance of environmental exposure.</td>
</tr>
<tr>
<td>Dietary pattern</td>
<td>4–5 components of the primary metrics</td>
<td>An overall healthy eating pattern</td>
<td>An overall healthy eating pattern</td>
<td>Balance calorie intake and physical activity to achieve or maintain a healthy body weight. Consume a diet rich in vegetables and fruits. Choose whole-grain, high-fiber foods. Consume fish, especially oily fish, at least twice a week. Limit intake of saturated fat to &lt;7% of energy, trans fat to &lt;1% of energy, and cholesterol to &lt;300 mg/d. Minimize intake of beverages and foods with added sugars. Choose and prepare foods with little or no salt. Consume alcohol in moderation if at all. When eating food prepared outside the home, follow the AHA Diet and Lifestyle Recommendations.</td>
</tr>
<tr>
<td>Physical activity</td>
<td>≥150 min/wk moderate intensity, ≥75 min/wk vigorous intensity, or a combination</td>
<td>At least 30 min of moderate-intensity physical activity on most (preferably all) days of the week</td>
<td>30 min, 7 d/wk (minimum, 5 d/wk)</td>
<td>For all patients, assess risk with a physical activity history and/or an exercise test to guide prescription. For high risk patients, consult physician before initiating vigorous exercise program. For all patients, encourage 30 to 60 min of moderate-intensity aerobic activity, such as brisk walking, on most days of the week, supplemented by flexibility training and an increase in daily lifestyle activities. Encourage resistance training at least 2 d per week.</td>
</tr>
<tr>
<td>Body mass index</td>
<td>&lt;25 kg/m²</td>
<td>Achieve and maintain desirable weight (body mass index, 18.5–24.9 kg/m²); when body mass index is ≥ 25 kg/m², waist circumference at iliac crest level ≤40 inches in men and ≤35 inches in women</td>
<td>Body mass index, 18.5 to 24.9 kg/m²; Waist circumference: &lt;40 inches in men and &lt;35 inches in women</td>
<td>Assess body mass index and/or waist circumference on each visit and consistently encourage weight maintenance/reduction through an appropriate balance of physical activity, caloric intake, and formal behavioral programs when indicated to maintain/achieve a body mass index between 18.5 and 24.9 kg/m². If waist circumference (measured horizontally at the iliac crest) is ≥ 35 inches in women and ≥ 40 inches in men, initiate lifestyle changes and consider treatment strategies for metabolic syndrome as indicated. For overweight/obese persons, reduce body weight by 10% in first year of therapy.</td>
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(Continued)
### Table 1. Continued

<table>
<thead>
<tr>
<th>Targeted Risk Factor</th>
<th>Ideal CV Health Definition Primordial Prevention Goals</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Blood pressure</td>
<td>&lt;120/80 mm Hg; &lt;140/90 mm Hg if renal insufficiency or heart failure is present; or &lt;130/80 mm Hg if diabetes mellitus is present</td>
<td>&lt;140/90 mm Hg or &lt;130/80 mm Hg if patient has diabetes mellitus or chronic kidney disease</td>
<td>LDL-C &lt;160 mg/dL; if triglycerides are &gt;100 mg/dL, then use non–HDL-C as a secondary goal: non–HDL-C &lt;190 mg/dL for ≤1 risk factor, non–HDL-C &lt;160 mg/dL for ≥2 risk factors and 10-y CHD risk ≤20%, non–HDL-C &lt;130 mg/dL for diabetics or for ≥2 risk factors and 10-y CHD risk &gt;20%. Other targets for therapy: triglycerides &gt;150 mg/dL and LDL-C &lt;160 mg/dL in men and &lt;190 mg/dL in women</td>
<td>For all patients: initiate or maintain lifestyle modification—weight control, increased physical activity, alcohol moderation, sodium reduction, and emphasis on increased consumption of fresh fruits, vegetables, and low-fat dairy products. For patients with blood pressure ≥140/90 mm Hg (or ≥130/80 mm Hg for individuals with chronic kidney disease or diabetes mellitus); as tolerated, add blood pressure medication, treating initially with β-blockers and/or angiotensin-converting enzyme inhibitors, with the addition of other drugs such as thiazides as needed to achieve goal blood pressure.</td>
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<tr>
<td>Cholesterol</td>
<td>&lt;200 mg/dL</td>
<td>LDL-C &lt;100 mg/dL; if triglycerides are &gt;190 mg/dL, LDL-C &lt;100 mg/dL, non–HDL-C should be &lt;130 mg/dL</td>
<td>LDL-C &lt;160 mg/dL; if triglycerides are &gt;190 mg/dL, non–HDL-C should be &lt;130 mg/dL</td>
<td>For all patients: start dietary therapy; reduce intake of saturated fats (to &lt;7% of total calories), trans-fatty acids, and cholesterol (to &lt;200 mg/d); adding plant sterols/sterolins (2 g/d) and viscous fiber (&gt;10 g/d) will further lower LDL-C; promote daily physical activity and weight management; encourage increased consumption of omega-3 fatty acids in the form of fish or in capsule form (1 g/d) for risk reduction. For lipid management: assess fasting lipid profile in all patients and within 24 h of hospitalization for those with an acute cardiovascular or coronary event; for hospitalized patients, initiate lipid-lowering medication as recommended below before discharge according to the following schedule: LDL-C should be &lt;100 mg/dL; if baseline LDL-C is [mtequ]&lt;100 mg/dL, initiate LDL-lowering drug therapy; if on-treatment LDL-C is [mtequ]&lt;100 mg/dL, intensify LDL-lowering drug therapy (may require LDL-lowering drug combination); if baseline LDL-C is 70–100 mg/dL, it is reasonable to treat to LDL-C &lt;70 mg/dL; if triglycerides are 200–499 mg/dL, non–HDL-C should be &lt;130 mg/dL, further reduction of non–HDL-C to &lt;100 mg/dL is reasonable. Therapeutic options to reduce non–HDL-C are more intense LDL-C-lowering therapy, niacin (after LDL-C-lowering therapy), or fibrate therapy (after LDL-C-lowering therapy). If triglycerides are ≥500 mg/dL, therapeutic options to prevent pancreatitis are fibrates or niacin before LDL-lowering therapy and treating LDL-C to goal after triglyceride-lowering therapy; achieve non–HDL-C &lt;130 mg/dL if possible.</td>
</tr>
<tr>
<td>Type 2 diabetes mellitus</td>
<td>Fasting plasma glucose &lt;100 mg/dL</td>
<td>Normal fasting plasma glucose (&lt;110 mg/dL) and near-normal hemoglobin A1c (&lt;7%)</td>
<td>Hemoglobin A1c &lt;7%</td>
<td>First-step therapy is vigorous modification of other risk factors (eg, physical activity, weight management, blood pressure control, and cholesterol management as recommended above). Second-step therapy is usually oral hypoglycemic drugs (sulfonylureas and/or metformin with ancillary use of acarbose and thiazolidinediones). Third-step therapy is insulin. Treat other risk factors more aggressively (eg, change BP goal to &lt;130/80 mm Hg and LDL-C goal to &lt;100 mg/dL). Coordinate diabetic care with the patient’s primary care physician or endocrinologist.</td>
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CV indicates cardiovascular; LDL-C, low-density lipoprotein cholesterol; CHD, coronary heart disease; and HDL-C, high-density lipoprotein cholesterol. Information adapted from American Heart Association guidelines for primordial prevention,

primary prevention,

secondary prevention,

and diet and lifestyle recommendations.
Disparities in CVD Health Status

Hypertension is a leading preventable cause of premature death in the United States and is a major contributor to the disparate burden of CVD borne by racial/ethnic minorities, particularly black Americans. Once diagnosed with high BP, racial/ethnic minorities are less likely to achieve adequate control and more likely to experience end-organ damage.\(^1\)\(^{11,16,17}\) Although more data are available for black Americans, high rates of hypertension have been noted for American Indians\(^1\)\(^{18}\) and Asian American populations.\(^1\)\(^9\) Mexican Americans have lower rates of hypertension compared with other racial/ethnic subgroups (although this may be more a function of undetected disease than true prevalence), but once diagnosed, they are the least likely to be controlled.\(^1\)\(^11\)

An estimated 47% of Americans \(\geq\)20 years of age have total blood cholesterol levels \(\geq\)200 mg/dL.\(^1\)\(^{11}\) Mexican American women and men have higher rates of dyslipidemia (51% and 49%, respectively) than their white counterparts, and they are less likely to be aware\(^1\)\(^{11}\) or controlled.\(^2\)\(^8\) Although black American men and women are less likely to experience dyslipidemia (40% and 42%, respectively),\(^1\)\(^{11}\) once identified, they are less likely to be controlled\(^1\)\(^{11}\) or prescribed lipid-lowering therapy\(^2\)\(^1\) than their white counterparts. Data on awareness, treatment, and control for Hispanics other than Mexican Americans, Asian Americans (including Asian subgroups), and AI/AN are not available and are needed.\(^1\)

Addressing obesity and diabetes mellitus is also critical for reducing overall CVD risk, as addressed in AHA statements.\(^2\)\(^{22-24}\) Downward shifts in population levels of cholesterol, BP, and smoking account for nearly half of the decline in age-standardized CVD deaths over the past 4 decades; however, increasing obesity and type 2 diabetes mellitus offset this trend and contribute to the persistent national CVD and stroke burden.\(^2\)\(^{25}\) Black women and Mexican American men\(^1\)\(^{11}\) are the most likely to have a body mass index \(\geq\)25 kg/m\(^2\) (80% and 75%, respectively). AI/AN populations are the most likely to be diagnosed with diabetes mellitus (15%), with high prevalence noted for black and Mexican American women (13%), black men (13%), and Native Hawaiians and other Pacific Islanders\(^2\)\(^6\) (12%) compared with white men and women (7%). Of particular concern in relation to global risk, the prevalence of \(\geq\)2 CVD risk factors was highest among black Americans and AI/AN (49% and 47%, respectively), although information on Hispanic/Latinos, Asian Americans, and Native Hawaiians and other Pacific Islanders is less complete than for blacks, whites, and Mexican Americans.\(^1\)

The recently released American Heart Association (AHA) science advisory on CVD risk factors in Asian Americans points to the need to collect more data on this heterogeneous racial/ethnic group.\(^10\) The authors note the rapid growth of the Asian American population and that only recently have subgroups of Asian Americans been included in national health surveys. Of particular importance, the thresholds for certain risk factors in Asian descent populations may differ from typical definitions.\(^27\) Studies suggest that Asians with lower body mass index compared with whites may have a similar proportion of body fat,\(^2\)\(^8\) and lower thresholds defining obesity have been identified.\(^10,29\) This information has relevance to clinical care because Asians have higher rates of diabetes mellitus than would be expected based on their body mass index levels.\(^30\) This same issue may apply to measures of high waist circumference, a well-established risk factor for insulin resistance and type 2 diabetes mellitus.\(^31\)

The value of preventing and controlling these CV risk factors is well established, and the disparities as presented are substantial. Thus, strategies to effectively reduce risk in these high-risk groups are of critical importance.

Disparities in CVD Lifestyle Risk Factors

Cigarette smoking continues to be a leading cause of preventable morbidity and mortality in the United States.\(^32\) The overall prevalence of active smokers among American adults is 21%; men are more likely to smoke than women (23% and 18%, respectively). Among racial/ethnic groups, AI/AN had the highest prevalence (24%), black Americans and whites had similar rates (21% and 22%, respectively), and Hispanics and Asians had the lowest rates (16% and 10%, respectively).\(^11,32\) Black Americans suffer a higher burden of health consequences of smoking, particularly lung cancer and cardiovascular disease, despite the fact that their smoking prevalence is similar to that of whites.\(^33,34\) Black and Hispanic smokers are less likely than whites to be asked about smoking habits or offered tobacco-cessation interventions\(^35,36\) despite the fact that they have higher health consequences of cigarette use.\(^37\) Few studies included Native Americans despite their high smoking rates.
Regular physical activity is essential to promote and maintain health. However, current estimates indicate that only 33% of Americans meet current physical activity recommendations.11 The lack of physical activity is associated with preventable morbidity and mortality,38 and differences in levels of physical activity are observed by race/ethnicity. American Indians and blacks were more likely to report not engaging in vigorous activity (68% and 66%, respectively) than white respondents, Asians, and Native Hawaiians and other Pacific Islanders (57%, 60%, and 61%, respectively).11 Although reported using a different metric, Hispanics are also relatively inactive; only 25% report regular leisure-time physical activity.11 Increasing physical activity is an important intervention target in both primary and secondary prevention of CVD and is associated with reductions in BP, lipid profiles, blood sugar, and weight, as well as maintaining healthy weight and sustaining weight loss once achieved38; this makes it imperative to implement successful strategies to improve health behaviors in diverse groups.

A Framework for Addressing Disparities in Health Care

Despite the plethora of studies documenting racial/ethnic disparities in cardiovascular health and the national goal of eliminating health disparities, these disparities persist. The Institute of Medicine, in its seminal report Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare, did much to raise public consciousness about disparities in health care and proposed a framework for conceptualizing the sources of disparities.2 They defined disparities as racial/ethnic differences that are not explained by the underlying condition or patient preferences. The Institute of Medicine suggested that understanding and addressing institutional (systems), provider (clinical encounter), and patient-level variables which lead to differences in the quality of healthcare received by minorities is critical to finding effective solutions.

The Robert Wood Johnson Foundation initiative, Finding Answers: Disparities Research for Change30 builds on the Institute of Medicine work. This work acknowledges that the social determinants of health, including poverty, education, and access to care, are significant barriers to equitable care40,41 and must be addressed to eliminate disparities42 and that these factors may be beyond the scope and control of providers. This initiative proposes a framework for providers and healthcare organizations to understand disparities solutions and posit that positive interactions between patients and providers, in a system that acknowledges individual characteristics, community values, and societal norms, can lead to improved processes of care, which in turn lead to improved outcomes.43

Behavioral Interventions to Prevent CVD or to Reduce Cardiovascular Risk

As noted previously, although considerable published data support the effectiveness of primary and secondary prevention of CVD risk factors on reducing all-cause cardiovascular morbidity and mortality across all racial/ethnic populations,5,8,44,45 achievement of risk reduction has not been optimal, particu-
been found to increase rates of smoking cessation in minority populations. Studies that combined a counseling intervention (8 brief cognitive-behavioral/motivational counseling sessions either in person or telephonically) in combination with sustained-release bupropion or transdermal nicotine patch yielded 6-month quit rates of 21% and 17%, respectively, for blacks. Combining open-label bupropion, the nicotine patch, and individual counseling in an 8-week intervention resulted in an impressive overall quit rate of 53%. Of note, the intervention was effective for all 3 racial/ethnic groups included in the study; however, black Americans benefitted to a lesser extent than Hispanics and whites (38%, 41%, and 60%, respectively).56

The use of clear, direct advice from healthcare providers to stop smoking continues to be the single most influential way to achieve smoking cessation in most patient populations, and when provider education is linked to system-wide change, cessation rates improve.55,57–59 Adding smoking status as a vital sign to the clinic assessment process increased the proportion of providers who asked about smoking status, advised patients to quit, and arranged follow-up.50 Clinic-wide initiatives, including culturally/linguistically tailored behavior-change stage-specific provider-delivered cessation advice and techniques, signed contracts, waiting room posters about cessation, written information, follow-up letters, postintervention behavioral counseling, electronic tracking, and medication cost reimbursement, were associated with greater reduction in smoking across racial/ethnic groups.60 Overall, given the significant disparities in smoking prevalence, cessation rates, and smoking-related morbidity and mortality experienced by racial/ethnic populations, it is encouraging to note that smoking-cessation interventions can be effective in these underserved populations, and it remains incumbent on clinicians to use best-practice strategies.

Behavioral Strategies to Improve Physical Activity and Heart-Healthy Nutrition

Lifestyle behaviors, including physical activity and dietary habits, are influenced by a complex constellation of personal and environmental factors. Cultural norms, values, beliefs, and practices contribute to shaping behavior and are important considerations in effective interventions to modify diet and exercise behaviors in diverse underserved racial/ethnic groups.61 Considerable interpersonal variation exists within any racial/ethnic subgroup; thus, personally tailored interventions within the cultural context appear to be most successful.61 Environmental factors such as lack of access to healthy affordable food or safe, affordable places to exercise exert a significant influence on healthy lifestyle behaviors. The AHA has several guidelines relevant to policy remedies to address the inequities in neighborhood resources supportive of following a healthy lifestyle.4,8

A 2010 AHA scientific statement provides an extensive review of behavioral interventions to modify adverse physical activity and dietary lifestyle changes and provides insight into effective strategies for increasing physical activity and heart-healthy nutrition.61 Of the 73 randomized trials reviewed, 25 permitted inferences about the success of the intervention in racial/ethnic minority participants. Most of these randomized trials examined interventions in black Americans (n=17) and Hispanics (n=8), with no trials having a sufficiently large sample of Asian Americans or American Indians to support inferences about these groups. Although the between-group effect sizes tended to be small (0.00–0.33),61 such modest changes can reflect clinically significant improvements in a substantial proportion of participants.62

Strategies to change physical activity and dietary intake targeted at individuals typically incorporate cognitive-behavioral techniques that focus on modifying the way an individual views situations, appraises the meaning of the situation, and makes choices.53,64 Common cognitive-behavioral techniques shown to be effective generally and in minority populations include goal setting, self-monitoring, feedback and reinforcement, self-efficacy enhancement, incentives, modeling, problem solving, relapse prevention, and motivational interviewing.61 Goals can be identified by the participant61,65,66 and/or provided65,67,68 and should be specific (measurable) and realistic but challenging and attainable in the specified time frame.61 Self-monitoring, developing an awareness of daily lifestyle habits and areas where these behaviors conflict (or concur) with desired behavior, can include simple strategies like handwritten diaries or more technology-based approaches such as online electronic logs and is associated with positive lifestyle change.69,70 The frequency and timing of behavioral interventions vary widely among studies. However, evidence suggests that multiple sessions are more effective than single-session interventions.61,66,67,70,71 Little research is available on the optimal number and timing of visits, but expert opinion suggests that a 12-week period is necessary to achieve behavior change64 and that follow-up should be assessed at 6 weeks and then at 6, 9, and 12 months and every 6 months thereafter.61 Several studies demonstrating dietary or physical activity changes that were sustained over 12 months in minority populations typically had follow-up contacts over at least 4 months.61,68

Changing behavior is a complex process that takes place over time and requires the individual to be able to solve problems and deal with relapses. Interventions that promote the individual’s ability to identify barriers to successful behavior change, to identify problems as they arise, and to identify and engage potential solutions are important in both achieving goals and maintaining success.61,65,66,72 When lapses occur, the ability to use these problem-solving techniques to monitor and adjust behavior (relapse prevention) is associated with continued success.61,66,72 Feedback and reinforcement, which allow providers to guide the individual through the process of changing behavior by highlighting progress toward goals and the consequences of nonadherence and by supporting relapse prevention, are frequently incorporated into successful behavior-change interventions.61,66,68 Self-efficacy, the individual’s perceived ability to make a desired change (eg, to incorporate the lifestyle changes into their life),61,73 has been associated with positive behavioral outcomes.61,68 Modeling a behavior entails incorporating a demonstration of the behavior in the intervention. Examples might include attending cooking demonstrations or observing peers engaging in this behavior. Studies that use modeling report favorable outcomes.61,68,74,75 In addition, motivational
intervening has captured the interest of clinicians recently and is associated with favorable adherence to dietary and physical activity recommendations. Motivational interviewing acknowledges the individual’s role and responsibility in making healthy choices and participating in their care. It challenges the individual to “own” his or her goals and choices and to recognize that change is an evolving process in which people both move forward toward goals (progress) and fall back on old patterns (relapse) but that success is within their reach. Motivational interviewing challenges the provider to relinquish ownership of the “truth” and to become a reflective listener.

Interventions that target the delivery of services have been studied and include both group and individual approaches. Behavioral interventions embedded in group sessions and including didactic education and the cognitive-behavioral counseling strategies mentioned above have been associated with positive outcomes. Individualized behavioral counseling provided by healthcare professionals allows the provider to tailor the message to the individual’s particular needs and has been shown to be effective. However, for underserved racial/ethnic groups, individual counseling may be less effective compared with group interventions.

Strategies to Reduce Hypertension

Several large hypertension trials have demonstrated that culturally tailored care that uses both systems (access to care) and individual strategies (behavioral and pharmacological) can effectively lower BP among members of racial/ethnic minority populations and that these changes can be sustained over time. The International Society on Hypertension in Blacks published a consensus statement that asserts that, with early and aggressive guideline-concordant treatment that is culturally and linguistically tailored, blacks can effectively lower BP among members of racial/ethnic communities and found 62 trials that enrolled at least 50% minority individuals between 1995 and 2006. They concluded that culturally tailored lifestyle interventions that target individuals, including nutrition counseling and exercise, are effective in lowering BP in minorities and that sodium restriction yields the greatest benefit in lowering BP in hypertensive black Americans. Note, all of these trials incorporated cultural tailoring (including linguistic/literacy needs) of individual and group interventions, a necessary first step in designing effective cross-cultural interventions.

Although individual-level interventions are effective, Davis and colleagues concluded that the greatest gain can be attained from organization-level interventions such as clinic reorganization and nurse-led multidisciplinary teams. Care coordination based on a team approach to care has been shown to be effective. This approach views healthcare professionals, patients, and community resources as integral members or components of the healthcare team and may be particularly important in busy clinics serving low-income populations where quality care is adversely affected by space, staffing, revenue, and other constraints. Interventions that focused on improving the quality of care processes, including individual tailoring of physician, nursing, pharmacist, and nutritionist services, were effective in improving rates of BP control in both whites and blacks in an academic family practice clinic and an urban public hospital, although sustaining the intervention was challenging. Interventions that included nursing and community health workers were found to be effective. Dennison and colleagues demonstrated that, even in young urban black men (a subgroup that is hard to reach and treat), BP can be reduced over time with an educational/behavioral/pharmacological intervention provided by a nurse-practitioner/community health worker/physician team. They noted, as did other researchers, that using principles of community-based participatory research in which the community is invited to be part of designing and implementing the intervention, integrating a community health worker within the team, and placing...
services in the community of the study participants were important contributors to the success of the intervention.

**Strategies to Reduce Hyperlipidemia**

Davis and colleagues\textsuperscript{105} reviewed 14 dyslipidemia intervention studies that enrolled a sufficient number of racial/ethnic and underserved populations to make inferences and concluded that interventions that target the individual and/or the healthcare system can be effective in improving lipid profiles. In a randomized, modified crossover trial, Ard and colleagues\textsuperscript{98} demonstrated that a program based on a modified Duke Rice Diet that included culturally sensitive recipes, addressed attitudes about exercise, and included family members in the weight loss efforts engineered a 3\% reduction in total cholesterol. The control group did not show a significant reduction. Another trial that focused on nutrition counseling randomized black men and women to either a self-help or a full-instruction behavior-oriented nutrition counseling intervention (reductions in intake of dietary fat, cholesterol, and sodium) designed to be suitable as an adjunct to usual physician care. Food cards and an illustrated nutrition guide for self-paced learning were introduced during an initial research clinic visit, with periodic brief counseling sessions with a nutritionist (baseline and every 4 months). The full-instruction group attended four group classes taught by a nutritionist and received a video, 12-part audio-series program, and workbook in addition to the food cards and nutrition guide. At the 12-month follow-up, an average 7\% to 8\% reduction in total cholesterol in both the self-help and full-instruction groups was demonstrated, with the largest reductions in those who reported greater use of the counseling materials.\textsuperscript{83}

Interventions that target the provider and healthcare organization have also been shown to improve lipid profiles in racial/ethnic and underserved populations. In 1 trial that enrolled primary care clinicians from community health centers, clinicians were randomized to treat their dyslipidemic patients (40\% blacks, 11\% American Indian) using usual care or a structured intervention. The intervention consisted of a structured assessment and treatment program (brief dietary assessment and three 5- to 10-minute dietary counseling sessions given by the primary care clinician, referral to a local dietitian if low-density lipoprotein [LDL] cholesterol remained elevated at 4-month follow-up, and a prompt for the clinician to consider lipid-lowering medication based on the LDL cholesterol at the 7-month follow-up). Total cholesterol and LDL decreased more in the intervention group than in the control group, although the changes were modest.\textsuperscript{115} Jenkins and colleagues\textsuperscript{107} examined whether a quality-improvement initiative (performance reports, chart prompts of eligible patients, evidence-based treatment recommendations) could improve lipid outcomes in a sample of black and white patients. After implementation of the quality-improvement initiative, the charts of 2860 dyslipidemic patients treated by 6 clinicians over a 1-year period were examined, and improvements in total cholesterol and HDL were observed for both groups.

**Strategies to Reduce Multiple Risk Factors in Low-Income Minority Populations**

Racial/ethnic minorities are more likely to have multiple risk factors, and clustering of risk factors is associated with higher risk of premature morbidity and mortality.\textsuperscript{3,111-\textsuperscript{116}} Data are accumulating that multidisciplinary, multicomponent interventions effectively reduce overall risk in underserved minority populations. A randomized clinical trial evaluating a nurse- and dietitian-led case management intervention for CVD risk reduction was undertaken within a large county healthcare system.\textsuperscript{117} Participants were low-income men and women, primarily racial/ethnic minorities with multiple risk factors. Intensive lifestyle change and evidence-based medical therapies for elevated risk factors formed the basis of the case-management interventions, which were delivered by Spanish-speaking nurses and dietitians in the county health clinic and were additive to usual primary care. In addition, participants in the study were referred to community exercise facilities, including senior centers, to improve adherence to physical activity recommendations. The primary outcome measure was change in Framingham Risk Score. At 16 months of follow-up, the mean Framingham Risk Score was significantly lower for the patients in case management compared with usual care after adjustment for baseline Framingham Risk Score. Changes in systolic and diastolic BPs were the main contributors to the reduction seen in the Framingham Risk Score. Although the overall changes were modest, they were clinically significant. The authors concluded that a culturally/linguistically competent, multidisciplinary, multicomponent intensive case management intervention for CVD risk reduction in low-income, predominantly racial/ethnic minority populations is an effective strategy for managing overall CVD risk.\textsuperscript{117}

In an earlier study by Haskell et al.\textsuperscript{114} multiethnic patients seen for primary care in predominantly free clinics were recruited to a randomized trial evaluating case management for CVD risk reduction. The disease management program was delivered by Spanish-speaking nurses and dietitians, supervised by physicians, and included comprehensive lifestyle changes and medications. Significant changes in BP, blood lipids, fasting blood glucose, self-reported measures of physical activity, and heart-healthy nutrition were found at the 12-month follow-up. These changes were attributed to improved use of and access to recommended medications, health education, and adherence to both lifestyle and pharmacological therapies.

Embedding the intervention in the community and explicitly addressing barriers to chronic disease management have been found to be effective in improving BP, lipids, and smoking. Becker and colleagues\textsuperscript{110} enrolled black American adults with a family history of CVD to participate in an enhanced primary care group or an urban community-based multicomponent CVD risk reduction intervention (CBC). In the CBC group, a nurse-practitioner provided disease management and a dietitian provided individual lifestyle counseling at a convenient site selected by the community of interest. Participants received their CVD and smoking-cessation medications free of charge at any pharmacy and were able to attend biweekly sessions at the YMCA led by the community
health worker. Both groups achieved significant reductions in LDL and BP at 1 year compared with baseline. The CBC group, however, was 2 times more likely to achieve LDL and BP goals. They also reported significant reductions in smoking status for the CBC group compared with the enhanced primary care group. These data suggest that, when access to essential services (medications, supports for lifestyle change) is held constant, black Americans can achieve treatment goals and that community-based, nurse-practitioner/community health worker care may improve outcomes. A 5-year follow-up demonstrated that the difference between the 2 groups was attenuated, with the CBC group demonstrating some regression toward baseline and the enhanced primary care group continuing to improve; however, compared with baseline, the positive changes in LDL, BP, and smoking observed for both groups were preserved. These studies and others suggest that implementation of a multidisciplinary, multifactorial approach to CVD risk reduction embedded in the community of interest is effective in low-income medically underserved patients.

Many of the interventions discussed thus far (physical activity, nutrition) also affect weight, body mass index, and glucose control; however, a comprehensive review of this literature is outside the scope of this article. In a rigorous systematic review of the diabetes health disparities literature, Peek and colleagues concluded that interventions that target patients (culturally/linguistically tailored interventions, peer support, and 1-on-1 interventions, but not online interventions), providers (treatment guidelines, provider education, computer decision support reminders/prompts, in-person feedback, and problem-based learning), and health organizations (electronic medical records, nurse-led multidisciplinary care management teams, databases, and rapid hemoglobin A1c testing) can achieve meaningful improvement in diabetes outcomes. They assert that we currently have the collective knowledge and skill necessary to apply these strategies in racial/ethnic and underserved populations.

Careful attention was paid to strategies to address the needs of racially/ethnically diverse populations enrolled in both PREMEIR and the Diabetes Prevention Program (DPP). Both of these studies demonstrated significant weight loss and enrolled a sufficient number of minority individuals to make inferences about effects in racial/ethnic subgroups. Examples of cultural tailoring from these trials include matching race/ethnicity of the patient and provider in some cases, tailoring the goals/information on the basis of the needs of the individual, exhibiting linguistic competence, adapting recipes and cooking demonstrations to be ethnically appropriate, providing multiple methods of self-monitoring, showing flexibility, and racial/ethnic tailoring of physical activity recommendations. Seidel and colleagues demonstrated that the DPP intervention can successfully be translated into an urban medically underserved community with significant reductions in weight (47% lost ≥5% of body weight and 26% lost ≥7%) and other metabolic end points. They modified the rigorous DPP intervention (6 months of weekly 1-on-1 sessions delivered by highly trained professionals) to be more aligned with the realities of practice in an underserved community. The modified intervention included 12 weekly 90-minute group sessions over 12 to 14 weeks, group classes led by a dietitian and exercise specialist, healthy food choices, emphasis on fat intake, and use of a pedometer to encourage increases in physical activity.

Translating Evidence to Practice: A Mandate for Effective Cross-Cultural Care

Effective cross-cultural care is important to implement CVD risk reduction strategies successfully across all racial/ethnic groups. This is particularly important given the observed disparities in CVD outcomes for racial/ethnic minorities. To engage with patients in ways that are culturally competent, providers need to have an awareness of their own cultural values and beliefs, knowledge of the patients’ views and experiences, and the requisite skills to deliver culturally/linguistically appropriate interventions. The language barriers faced by non–English-speaking individuals need to be considered and literacy needs to be assessed to address the needs of those individuals with low educational attainment. For lifestyle behavior changes, cultural competence includes recognition that the patient must incorporate clinical guidance into his or her daily routines for fundamental behavioral and social processes such as eating and the ability to motivate and facilitate this process. This can be very different from facilitating adherence to medication regimens. Table 2 outlines some of the cross-cultural considerations that should be kept in mind when providing prevention counseling to individuals or groups. Additional resources for acquiring cultural and linguistic competencies are available from the Health Resources and Services Administration and the Office of Minority Health. Acquisition of cross-cultural skills, however, is not simple, nor does it follow a cookbook approach. It requires time, patience, and a commitment to meeting the needs of each person as a unique individual.

It is often challenging for healthcare providers to recognize that personal, professional, and organizational cultures have a significant impact on care. By definition, healthcare providers bring expert, disease-specific knowledge to the patient-provider interaction, and this often informs the providers’ expectations of patient behaviors (adherence) regardless of how the patient might embrace and/or follow the advice. Negotiating care on the basis of both provider and patient expectations is critical to successful outcomes, and it is the responsibility of the provider, not the patient, to find a way to bridge these differences and to create win-win scenarios.

Summary and Conclusions

Within the broad spectrum of strategies needed to address disparities in CVD, behavioral strategies that can be effectively implemented in clinical settings have a critical role. The literature reviewed in this article provides a menu of options for facilitating behavioral CVD risk reduction in diverse, underserved racial/ethnic groups. Several themes have emerged. It is clear that interventions need to be culturally and linguistically tailored and individualized, with an understanding that racial/ethnic groups are not monolithic. Multicomponent, multidisciplinary teams, often led by a nurse, appear to be the most effective in addressing multiple risk reduction. Including community health workers in the
multidisciplinary team is an important addition to address the needs of individuals living in underresourced areas. Efforts that target providers and the way they deliver behavioral interventions are important to achieve sustained, system-wide improvement in outcomes.

Going forward, it will be important for published reports of successful interventions to provide more detailed information on the specifics of the intervention so that the intervention can be disseminated and translated into practice. Often, the nuances of these interventions, information important to successful implementation, are lost. It is also important for research studies, including large clinical trials, to include more diverse subjects so that racial/ethnic subgroup comparisons can be made. Oversampling racial/ethnic minorities, including understudied subgroups in the Asian, Hispanic, and American/Indian/Alaska Native communities, is necessary so that inferences can be made for these populations.

The AHA recently released its strategic impact goal: “[b]y 2020, to improve the cardiovascular health of all Americans by 20% while reducing deaths from cardiovascular diseases and stroke by 20%.”

To achieve the greatest reduction in risk, population-wide approaches to CVD risk in high-risk individuals, it is estimated that the majority of CVD and stroke events occur in individuals with average or only mildly elevated levels of risk, ie, the majority of the population.

To achieve this ambitious goal, clinicians and healthcare organizations will need to implement strategies to reduce CVD risk in racial/ethnic and underserved populations that bear a disproportionate burden of disease. To meet this goal, we will be challenged to broaden our prevention perspective beyond primary and secondary prevention to include primordial prevention across the lifespan, a challenge that will require cardiologists to collaborate with clinicians from primary care, nursing, nutrition, pharmacy, family medicine, pediatrics, and exercise science. Although this review has focused predominantly on behavioral risk reduction strategies in high-risk individuals, it is estimated that the majority of CVD and stroke events occur in individuals with average or only mildly elevated levels of risk, ie, the majority of the population.

To achieve the greatest reduction in risk, population-wide approaches to CVD risk in understudied racial/ethnic minority communities, in addition to the individual-level interventions described here, are necessary.

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**Disclosures**

None.

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