AHA Scientific Statement

Diet and Lifestyle Recommendations Revision 2006

A Scientific Statement From the American Heart Association Nutrition Committee

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***Abstract*—**Improving diet and lifestyle is a critical component of the American Heart Association's strategy for cardiovascular disease risk reduction in the general population. This document presents recommendations designed to meet this objective. Specific goals are to consume an overall healthy diet; aim for a healthy body weight; aim for recommended levels of low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, and triglycerides; aim for normal blood pressure; aim for a normal blood glucose level; be physically active; and avoid use of and exposure to tobacco products. The recommendations are to balance caloric intake and physical activity to achieve and 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 <7% of energy, *trans* fat to <1% of energy, and cholesterol to <300 mg/day by choosing lean meats and vegetable alternatives, fat-free (skim) or low-fat (1% fat) dairy products and minimize intake of partially hydrogenated fats; minimize intake of beverages and foods with added sugars; choose and prepare foods with little or no salt; if you consume alcohol, do so in moderation; and when you eat food prepared outside of the home, follow these Diet and Lifestyle Recommendations. By adhering to these diet and lifestyle recommendations, Americans can substantially reduce their risk of developing cardiovascular disease, which remains the leading cause of morbidity and mortality in the United States. **(*Circulation*. 2006;114:82-96.)**

Key Words: AHA Scientific Statements ■ nutrition ■ cardiovascular diseases

Improving diet and lifestyle is a critical component of the American Heart Association's (AHA's) strategy to prevent cardiovascular disease (CVD), the leading cause of morbidity and mortality in Americans. This document presents diet and lifestyle recommendations designed to meet this objective. Several features distinguish this set of recommendations from previous AHA Dietary Guideline versions: (1) Recognizing that diet is part of an overall healthy lifestyle, *Lifestyle* has been added to the title. (2) The 2006 recommendations incorporate new scientific evidence that has emerged after publication of the last set of guidelines in 2000.[1] (3) The 2006 recommendations have been reformatted so that they are more easily understood. (4) A section raising awareness about environmental influences on CVD health behaviors has been included. (5) Practical guidance on how to achieve diet and lifestyle changes is provided. (6) The importance of following the recommendations when eating at home and away from home is emphasized. (7) The vital roles of healthcare professionals, restaurants, the food industry, schools, and local policies are highlighted, along with specific recommendations to these groups. This last feature and the focus on CVD prevention are the principal differences between these recommendations and those from the US Departments of Agriculture and Health and Human Services.[2]

Consistent with the strategic plan of the AHA, the 2006 AHA Diet and Lifestyle Recommendations are one component of a comprehensive plan to achieve specific goals for

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TABLE 1. AHA 2006 Diet and Lifestyle Goals for Cardiovascular Disease Risk Reduction

- Consume an overall healthy diet.
- Aim for a healthy body weight.
- Aim for recommended levels of low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol, and triglycerides.
- Aim for a normal blood pressure.
- Aim for a normal blood glucose level.
- Be physically active.
- Avoid use of and exposure to tobacco products.

cardiovascular risk reduction (Table 1). The recommendations (Table 2) are appropriate for the general public, including adults and children over 2 years of age. Separate AHA dietary guidelines specifically addressing the special needs of growing children have recently been published.[3] The AHA 2006 Diet and Lifestyle Recommendations are intentionally flexible to meet the unique needs for growth, development, and aging.

Evidence cited in this report is drawn from many authoritative documents, including previous AHA scientific statements and other evidence-based reviews, as well as seminal studies and national surveys.

Public Health and Clinical Application of AHA Diet and Lifestyle Recommendations

Public Health Recommendations

The AHA has traditionally provided dietary recommendations and recommendations for an overall healthy lifestyle to the American public with the goal of reducing risk for CVD, the No. 1 killer of Americans. Maintaining a healthy diet and lifestyle offers the greatest potential of all known approaches for reducing the risk for CVD in the general public. This is still true in spite of major advances in clinical medicine. The recommendations contained in this document provide a foundation for a public health approach to CVD risk reduction through healthy eating habits and other lifestyle factors. In recent years, obesity has emerged as a major nutritional problem in the United States. For this reason, this document contains expanded information on nutrition and physical activity approaches to preventing or managing obesity and minimizing its complications.

Clinical Recommendations

The general recommendations contained in this document generally can be applied to the clinical management of patients with or at risk for CVD. For certain patients at higher risk, the recommendations may have to be intensified. Although great advances have been made in prevention and treatment of CVD through drug therapies and procedures, diet and lifestyle therapies remain the foundation of clinical intervention for prevention. Unfortunately, the latter commonly are neglected, to the detriment of patients. Rigorous application of the principles of diet and lifestyle intervention outlined in this document to patients at risk will contribute significantly to risk reduction and will augment the benefit that may be obtained by other approaches. The clinical approach is an extension of the public health approach, with some modifications depending on the type of patient.

Goals

The AHA Diet and Lifestyle Goals are intended to reduce CVD risk (Table 1). They provide guidance for adults and children over the age of 2 years.

Consume an Overall Healthy Diet

Although the vast majority of research studies have focused on individual nutrients and foods, it is well recognized that multiple dietary factors influence the risk of developing CVD and its major risk factors. To a much lesser extent, research has examined the health effects of the whole diet; both observational studies and clinical trials. These data have documented that healthy dietary patterns are associated with a substantially reduced risk of CVD,[4] CVD risk factors,[5,6] and noncardiovascular diseases.[7] An emphasis on whole diet is also appropriate to ensure nutrient adequacy and energy balance.[2] Hence, rather than focusing on a single nutrient or food, individuals should aim to improve their whole or overall diet. Consistent with this principle, the AHA recommends that individuals consume a variety of fruits, vegetables, and grain products, especially whole grains; choose fat-free and low-fat dairy products, legumes, poultry, and lean meats; and eat fish, preferably oily fish, at least twice a week (Table 2).

Aim for a Healthy Body Weight

A healthy body weight is currently defined as a body mass index (BMI) of 18.5 to 24.9 kg/m^2. Overweight is a BMI

TABLE 2. AHA 2006 Diet and Lifestyle Recommendations for Cardiovascular Disease Risk Reduction

- 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 your intake of saturated fat to <7% of energy, *trans* fat to <1% of energy, and cholesterol to <300 mg per day by
  - — choosing lean meats and vegetable alternatives;
  - — selecting fat-free (skim), 1%-fat, and low-fat dairy products; and
  - — minimizing intake of partially hydrogenated fats.
- Minimize your intake of beverages and foods with added sugars.
- Choose and prepare foods with little or no salt.
- If you consume alcohol, do so in moderation.
- When you eat food that is prepared outside of the home, follow the AHA Diet and Lifestyle Recommendations.

between 25 and 29.9 kg/m^2, and obesity is a BMI ≥30 kg/m^2. In the United States, achieving and maintaining a healthy weight throughout life is particularly difficult. Currently, about one third of adults are overweight, and an additional one third are obese.[8,9] The prevalence of overweight and obesity has increased dramatically over the past 20 years, and the problem has now reached epidemic proportions.[9,10] Of particular concern is that this trend has shown no signs of abating.

Obesity is an independent risk factor for CVD.[11] Excess body weight adversely affects CVD risk factors (eg, increasing low-density lipoprotein [LDL] cholesterol levels, triglyceride levels, blood pressure [BP], and blood glucose levels, and reducing high-density lipoprotein [HDL] cholesterol levels) and increases the risk of developing coronary heart disease (CHD), heart failure, stroke, and cardiac arrhythmias.

The causes of this dramatic population-wide increase in overweight and obesity are multifactorial. Implicated factors include increased portion sizes; high–calorie-density foods; easy access to plentiful, inexpensive food; sedentary lifestyle; and commercial and cultural influences that, in aggregate, encourage calorie consumption in excess of calorie utilization. No one factor appears responsible for the epidemic. Hence, the optimal strategy to retard the epidemic must likewise be multifactorial.

Achieving and maintaining a healthy weight throughout the life cycle are critical factors in reducing CVD risk in the general population. Data indicate that body weight at 18 years tracks with subsequent risk of developing CVD and diabetes, as does weight gain after 18 years of age.[12] It is important to intensify efforts in the general population to help individuals avoid inappropriate weight gain during childhood and subsequent weight gain during adult years. Increased emphasis should be put on prevention of weight gain, because achievement and maintenance of weight loss, although certainly possible, require more difficult behavioral changes (ie, greater calorie reduction and more physical activity) than prevention of weight gain in the first place.[13,14]

Aim for a Desirable Lipid Profile

LDL, which is the major cholesterol-carrying lipoprotein particle in plasma, is primarily derived from lipoprotein particles made by the liver. As levels of LDL cholesterol increase, so does the risk of developing CVD.[15] LDL levels are classified as follows: optimal, <100 mg/dL; near or above optimal, 100 to 129 mg/dL; borderline high, 130 to 159 mg/dL; high, 160 to 189 mg/dL; and very high, ≥190 mg/dL.[15] Among non-Hispanic whites living in the United States, 17% of women and 20% of men have LDL cholesterol levels >160 mg/dL.[9] Corresponding estimates for non-Hispanic blacks are 19% of women and 19% of men, and for Mexican Americans, 14% of women and 17% of men.[9]

Current recommendations for LDL cholesterol goals depend on the estimated 10-year risk of developing CVD and the presence of CVD-related risk factors.[15] Although drug therapy is often prescribed for those at moderate or high risk, dietary changes are recommended for all individuals. The strongest dietary determinants of elevated LDL cholesterol concentrations are dietary saturated fatty acid and *trans* fatty acid intakes. *Trans* fatty acids tend to increase LDL cholesterol levels slightly less than saturated fatty acids, whereas saturated fatty acids increase HDL cholesterol concentrations but *trans* fatty acids do not.[16] To a lesser extent, dietary cholesterol and excess body weight are positively related to levels of LDL cholesterol.[15]

HDL cholesterol and triglycerides are other plasma lipid measures related to CVD risk that can be affected by diet and body weight.[17,18] The concentration of HDL cholesterol is inversely associated with the risk of developing CVD.[15] This association is thought to be mediated by a constellation of events collectively referred to as reverse cholesterol transport—the transport of cholesterol from peripheral tissues to the liver for subsequent metabolism or excretion. HDL directly protects against the development of atherosclerosis. The major nongenetic determinants of low HDL cholesterol levels are hyperglycemia, diabetes, hypertriglyceridemia, very low-fat diets (<15% energy as fat), and excess body weight.[17] Although at this time there are no HDL cholesterol goals as there are for LDL cholesterol, levels <50 mg/dL in women and <40 mg/dL in men are considered one of the criteria for the classification of metabolic syndrome.[15] Likewise, although at this time there are no triglyceride goals, levels >150 mg/dL are considered one of the criteria for the classification of metabolic syndrome.[15] In general, a moderate inverse relationship exists between triglyceride and HDL cholesterol concentrations, and determinants of high triglycerides are mainly the same as those of low HDL cholesterol.[17]

Aim for a Normal Blood Pressure

A normal BP is a systolic BP <120 mm Hg and a diastolic BP <80 mm Hg. BP is a strong, consistent, continuous, independent, and etiologically relevant risk factor for cardiovascular-renal disease. Notably, no evidence of a BP threshold exists—that is, the risk of CVD increases progressively throughout the range of BP, including the prehypertensive range (a systolic BP of 120 to 139 mm Hg or diastolic BP of 80 to 89 mm Hg).[19] Hence, efforts to reduce BP to normal levels are warranted, even among individuals with prehypertension.

According to the most recent National Health and Nutrition Examination Survey (NHANES) (1999–2000), 27% of adult Americans have hypertension (systolic BP ≥140 mm Hg, diastolic BP ≥90 mm Hg, or use of antihypertensive medication), and another 31% have prehypertension.[20] It has been estimated that among adults >50 years of age, the lifetime risk of developing hypertension approaches 90%. On average, blacks have higher BP than do nonblacks, as well as an increased risk of BP-related complications.

Elevated BP results from environmental factors, genetic factors, and interactions among these factors. Of the environmental factors that affect BP (ie, diet, physical inactivity, toxins, and psychosocial factors), dietary factors have a prominent, and likely predominant, role. A substantial body of evidence strongly supports the concept that multiple dietary factors affect BP.[21] Dietary modifications that lower BP are reduced salt intake, caloric deficit to induce weight loss, moderation of alcohol consumption (among those who drink), increased potassium intake, and consumption of an

overall healthy diet, based on the DASH (Dietary Approaches to Stop Hypertension) diet.[5] The latter is a carbohydrate-rich diet that emphasizes fruits, vegetables, and low-fat dairy products; includes whole grains, poultry, fish, and nuts; and is reduced in fats, red meat, sweets, and sugar-containing beverages. Replacement of some carbohydrates with either protein from plant sources or with monounsaturated fat can further lower BP.[6]

Aim for a Normal Blood Glucose Level

A normal fasting glucose level is ≤100 mg/dL, whereas diabetes is defined by a fasting glucose level ≥126 mg/dL. Hyperglycemia and the often-associated insulin resistance are related to numerous cardiovascular complications, including CHD, stroke, peripheral vascular disease, cardiomyopathy, and heart failure. Type 2 diabetes is the most common form of diabetes. Reducing caloric intake and increasing physical activity to achieve even a modest weight loss can decrease insulin resistance and improve glucose control and the concomitant metabolic abnormalities. In nondiabetic individuals, weight loss and increased physical activity can delay the onset of and possibly prevent diabetes.[22,23]

Be Physically Active

Regular physical activity is essential for maintaining physical and cardiovascular fitness, maintaining healthy weight, and sustaining weight loss once achieved.[24] Current estimates indicate that 61% of US adults do not engage in any regular physical activity.[9] A sedentary lifestyle is associated with older age and is more common among Hispanic or Latino and black adults than among white adults. Regular physical activity improves cardiovascular risk factors (BP, lipid profiles, and blood sugar) and lowers the risk of developing other chronic diseases, including type 2 diabetes, osteoporosis, obesity, depression, and cancer of the breast and colon.[25]

Avoid Use of and Exposure to Tobacco Products

On the basis of the overwhelming evidence for the adverse effects of tobacco products and secondary exposure to tobacco smoke on CVD, as well as cancer and other serious illness, the AHA strongly and unequivocally endorses efforts to eliminate the use of tobacco products and minimize exposure to second-hand smoke.[26–28] Nearly 23% of US adults smoke, with the highest rates in American Indian/Alaskan Native women (37%) and the lowest rates in Asian women (7%).[9] Because cessation of smoking in habitual smokers can be associated with weight gain, particular attention should be given to preventing this outcome.[29] Concern about weight gain should not be a reason for continued use of tobacco products.

AHA Diet and Lifestyle Recommendations

The AHA 2006 Diet and Lifestyle Recommendations (Table 2) are intended to reduce CVD risk. These recommendations are intentionally presented in a manner that allows maximal flexibility in their implementation among a group of individuals with a wide range of dietary preferences and to meet the unique needs for growth, development, and aging. They are not presented as a "diet plan," per se, but rather a lifestyle prescription to promote cardiovascular health. Practical approaches for implementing these recommendations are presented in Table 3. Two examples of eating patterns at 2000 calories per day that meet the AHA 2006 Diet and Lifestyle Recommendations are presented in Table 4. The 2 examples provide a general framework to aid health practitioners in giving general, practical food-group–based guidance. The example of 2000 calories is provided for consistency with the Nutrition Facts Panel. For individuals who consume more or less than 2000 calories, appropriate adjustments in number of servings per day that are consistent with achieving and maintaining a healthy body weight should be made.

Although the recommendations present guidance about specific nutrients and types of foods, the importance of an overall healthy diet and lifestyle cannot be overemphasized. Multiple dietary factors influence CVD risk, and not all do so via changes in the risk factors described above. Hence, CVD benefit is likely to accrue by adherence to a healthy diet and lifestyle even if these risk factors are not markedly altered. Although the Food and Drug Administration (FDA) has sanctioned health claims for certain nutrients and foods, a focus on the overall diet is preferred over a specific focus on individual dietary components. This is, in part, due to the overarching goal of achieving energy balance and nutrient adequacy. If a specific food or category of foods is added to, rather than used to displace, other food from the diet (eg, as a result of an FDA claim or new research finding), then the additional calories can lead to weight gain.

Balance Calorie Intake and Physical Activity to Achieve or Maintain a Healthy Body Weight

To avoid weight gain after childhood, individuals must control calorie intake so that energy balance is achieved—that is, energy intake matches energy expenditure. To control calorie intake, individuals should increase their awareness of the calorie content of foods and beverages per portion consumed and should control portion size.[30] The macronutrient composition of a diet (ie, the amount of fat, carbohydrate, and protein) has little effect on energy balance unless macronutrient manipulation influences total energy intake or expenditure.[30] While reducing caloric intake, individuals should adopt and maintain a diet consistent with recommendations in this document (Table 2).

A physically active lifestyle is recommended to reduce risk for CVD in all individuals, regardless of body weight.[13] Regular physical activity also reduces symptoms in patients with established CVD. Among individuals who are overweight or obese, regular physical activity along with calorie restriction is recommended as a means to achieve weight loss. Regular daily physical activity has been shown to be particularly effective in maintaining weight loss once achieved.[14]

The AHA recommends that all adults accumulate ≥30 minutes of physical activity most days of the week. Additional benefits will likely be derived if activity levels exceed this minimum recommendation. At least 60 minutes of physical activity most days of the week is recommended for adults who are attempting to lose weight or maintain weight loss and for children. The physical activity can be accumu-

TABLE 3. Practical Tips to Implement AHA 2006 Diet and Lifestyle Recommendations

Lifestyle

- Know your caloric needs to achieve and maintain a healthy weight.
- Know the calorie content of the foods and beverages you consume.
- Track your weight, physical activity, and calorie intake.
- Prepare and eat smaller portions.
- Track and, when possible, decrease screen time (eg, watching television, surfing the Web, playing computer games).
- Incorporate physical movement into habitual activities.
- Do not smoke or use tobacco products.
- If you consume alcohol, do so in moderation (equivalent of no more than 1 drink in women or 2 drinks in men per day).

Food choices and preparation

- Use the nutrition facts panel and ingredients list when choosing foods to buy.
- Eat fresh, frozen, and canned vegetables and fruits without high-calorie sauces and added salt and sugars.
- Replace high-calorie foods with fruits and vegetables.
- Increase fiber intake by eating beans (legumes), whole-grain products, fruits, and vegetables.
- Use liquid vegetable oils in place of solid fats.
- Limit beverages and foods high in added sugars. Common forms of added sugars are sucrose, glucose, fructose, maltose, dextrose, corn syrups, concentrated fruit juice, and honey.
- Choose foods made with whole grains. Common forms of whole grains are whole wheat, oats/oatmeal, rye, barley, corn, popcorn, brown rice, wild rice, buckwheat, triticale, bulgur (cracked wheat), millet, quinoa, and sorghum.
- Cut back on pastries and high-calorie bakery products (eg, muffins, doughnuts).
- Select milk and dairy products that are either fat free or low fat.
- Reduce salt intake by
  - —comparing the sodium content of similar products (eg, different brands of tomato sauce) and choosing products with less salt;
  - —choosing versions of processed foods, including cereals and baked goods, that are reduced in salt; and
  - —limiting condiments (eg, soy sauce, ketchup).
- Use lean cuts of meat and remove skin from poultry before eating.
- Limit processed meats that are high in saturated fat and sodium.
- Grill, bake, or broil fish, meat, and poultry.
- Incorporate vegetable-based meat substitutes into favorite recipes.
- Encourage the consumption of whole vegetables and fruits in place of juices.

lated throughout the day. It is not easy for individuals to achieve these goals. However, it is important to encourage behaviors that will facilitate achieving and maintaining these goals over time. Achieving a physically active lifestyle requires effective time management, with a particular focus on reducing sedentary activities such as screen time (eg, watching television, surfing the Web, playing computer games) and making daily choices to move rather than be moved (eg, taking the stairs instead of the elevator).

Consume a Diet Rich in Vegetables and Fruits

Most vegetables and fruits are rich in nutrients, low in calories, and high in fiber. Therefore, diets high in vegetables and fruits meet micronutrient, macronutrient, and fiber requirements without adding substantially to overall energy consumption. Whether it is the vegetables and fruits themselves or the absence of other foods displaced from the diet that is associated with CVD risk reduction has yet to be determined. Regardless, diets rich in vegetables and fruits have been shown to lower BP and improve other CVD risk factors in short-term randomized trials.[5,6,31] In longitudinal observation studies, persons who regularly consume such diets are at a lower risk of developing CVD, particularly stroke.[32,33]

A variety of vegetables and fruits are recommended. Vegetables and fruits that are deeply colored throughout (eg, spinach, carrots, peaches, berries) should be emphasized because they tend to be higher in micronutrient content than are other vegetables and fruits such as potatoes and corn. Fruit juice is not equivalent to the whole fruit in fiber content and perhaps satiety value and should not be emphasized. A diet rich in vegetables and fruits is a strategy for lowering the energy density of the diet to control energy intake. Equally important is the method of preparation. Techniques that preserve nutrient and fiber content without adding unnecessary calories, saturated or *trans* fat, sugar, and salt are recommended (Table 3).

Choose Whole-Grain, High-Fiber Foods

Dietary patterns that are high in whole-grain products and fiber have been associated with increased diet quality and decreased risk of CVD.[34] Soluble or viscous fibers (notably β-glucan and pectin) modestly reduce LDL cholesterol levels beyond those achieved by a diet low in saturated and *trans*

TABLE 4. Two Examples of Daily Dietary Patterns That Are Consistent With AHA-Recommended Dietary Goals at 2000 Calories

Eating Pattern	DASH*	TLC†	Serving Sizes
Grains‡	6 to 8 servings per day	7 servings§ per day	1 slice bread; 1 oz dry cereal¶; ½ cup cooked rice, pasta, or cereal
Vegetables	4 to 5 servings per day	5 servings§ per day	1 cup raw leafy vegetable, ½ cup cut-up raw or cooked vegetable, ½ cup vegetable juice
Fruits	4 to 5 servings per day	4 servings§ per day	1 medium fruit; ¼ cup dried fruit; ½ cup fresh, frozen, or canned fruit; ½ cup fruit juice
Fat-free or low-fat milk and milk products	2 to 3 servings per day	2 to 3 servings per day	1 cup milk, 1 cup yogurt, 1½ oz cheese
Lean‖ meats, poultry, and fish	<6 oz per day	≤5 oz per day	
Nuts, seeds, and legumes	4 to 5 servings per week	Counted in vegetable servings.	⅓ cup (1½ oz), 2 Tbsp peanut butter, 2 Tbsp or ½ oz seeds, ½ cup dry beans or peas
Fats and oils	2 to 3 servings# per day	Amount depends on daily calorie level	1 tsp soft margarine, 1 Tbsp mayonnaise, 2 Tbsp salad dressing, 1 tsp vegetable oil
Sweets and added sugars	5 or fewer servings per week	No recommendation	1 Tbsp sugar, 1 Tbsp jelly or jam, ½ cup sorbet and ices, 1 cup lemonade

*Dietary Approaches to Stop Hypertension. For more information, please visit http://www.nhlbi.nih.gov/health/public/heart/hbp/dash.

†Therapeutic Lifestyle Changes. For more information, please visit http://www.nhlbi.nih.gov/cgi-bin/chd/step2intro.cgi. TLC includes 2 therapeutic diet options: Plant stanol/sterol (add 2 g per day) and soluble fiber (add 5 to 10 g per day).

‡Whole-grain foods are recommended for most grain servings to meet fiber recommendations.

§This number can be less or more depending on other food choices to meet 2000 calories.

¶Equals ½ to 1¼ cups, depending on cereal type. Check the product's Nutrition Facts Label.

‖Lean cuts include sirloin tip, round steak, and rump roast; extra lean hamburger; and cold cuts made with lean meat or soy protein. Lean cuts of pork are center-cut ham, loin chops, and pork tenderloin.

#Fat content changes serving counts for fats and oils: For example, 1 Tbsp of regular salad dressing equals 1 serving; 1 Tbsp of low-fat dressing equals ½ serving; 1 Tbsp of fat-free dressing equals 0 servings.

fatty acids and cholesterol alone.[35] Insoluble fiber has been associated with decreased CVD risk[36–38] and slower progression of CVD in high-risk individuals.[39] Dietary fiber may promote satiety by slowing gastric emptying, leading to an overall decrease in calorie intake.[40,41] Soluble fiber may increase short-chain fatty acid synthesis, thereby reducing endogenous cholesterol production.[41] The AHA recommends that at least half of grain intake come from whole grains.

Consume Fish, Especially Oily Fish, at Least Twice a Week

Fish, especially oily fish, is rich in very long-chain omega-3 polyunsaturated fatty acids: eicosapentaenoic acid, C20:5n-3 (EPA) and docosahexaenoic acid, C22:6n-3 (DHA). The consumption of 2 servings (≈8 ounces) per week of fish high in EPA and DHA is associated with a reduced risk of both sudden death and death from coronary artery disease in adults.[42,43] In addition to providing EPA and DHA, regular fish consumption may facilitate the displacement of other foods higher in saturated and *trans* fatty acids from the diet, such as fatty meats and full-fat dairy products. Methods used to prepare fish should minimize the addition of saturated and *trans* fatty acids, as occurs with the use of cream sauces or hydrogenated fat during frying.

Contamination of certain fish with methyl mercury, polychlorinated biphenyls, and other organic compounds is a potential concern.[44] Subgroups of the population, primarily children and pregnant women, are advised by the FDA to avoid eating those fish with the potential for the highest level of mercury contamination (eg, shark, swordfish, king mackerel, or tilefish), eat up to 12 ounces (2 average meals) per week of a variety of fish and shellfish that are lower in mercury (eg, canned light tuna, salmon, pollock, catfish), and check local advisories about the safety of fish caught by family and friends in local lakes, rivers, and coastal areas.[45] Potential exposure to some contaminants can be reduced by removing the skin and surface fat from these fish before cooking. For middle-aged and older men and postmenopausal women, the benefits of fish consumption far outweigh the potential risks when amounts of fish are eaten within the recommendations established by the FDA and Environmental Protection Agency. Consumers should also check with local and state authorities about types of fish and watersheds that may be contaminated and the FDA Web site for the most up-to-date information on recommendations for specific subgroups of the US populations (eg, children, pregnant women).

Limit Your Intake of Saturated and *Trans* Fat and Cholesterol

As a set of goals, the AHA recommends intakes of <7% of energy as saturated fat, <1% of energy as *trans* fat, and <300 mg cholesterol per day. These goals can be achieved by (1) choosing lean meats and vegetable alternatives; (2) selecting fat-free (skim), 1%-fat, and low-fat dairy products; and (3) minimizing intake of partially hydrogenated fats.

Diets low in saturated and *trans* fatty acids and cholesterol reduce the risk of CVD, in large part through their effects on LDL cholesterol levels. For all age groups of the US population, in 1999 to 2000, the daily mean percentage of calories from saturated fats was 11.2.[46] In those same years, average cholesterol intakes for men and women ages 20 to 74 years were 341 mg and 242 mg, respectively.[46] The mean

trans fatty acid intake has been estimated to be ≈2.7% of energy.[47] This number should only be considered a crude estimate because it is likely current intakes are shifting, in part prompted by the new *trans* fatty acid labeling requirement. Subgroups within the population are likely to have higher or lower intakes based on their habitual dietary practices.

In the current US diet, the major sources of saturated fatty acids are animal fats (meat and dairy), and the primary sources of *trans* fatty acids are partially hydrogenated fats used to prepare commercially fried and baked products. Major sources of dietary cholesterol are foods of animal origin (eggs, dairy, and meat). Saturated and *trans* fatty acid intakes are directly related to LDL cholesterol levels.[48–50] Increased dietary cholesterol intake also raises LDL cholesterol concentrations.

Efforts to reduce saturated fat and cholesterol typically rely on replacement of animal fats with unsaturated fats (polyunsaturated and monounsaturated fats) and on selection of lower-fat versions of foods (eg, replacing full-fat dairy products with nonfat or low-fat versions). Replacing meats with vegetable alternatives (eg, beans) or fish is one strategy to replace saturated fats with unsaturated fats and reduce the cholesterol content. In view of the positive linear relationship among dietary saturated fat, LDL cholesterol, and CVD risk, and current US intakes, the AHA now recommends a population-wide goal of <7% of energy.

Efforts to reduce *trans* fatty acids typically rely on the substitution of partially hydrogenated fats with those made with liquid vegetable oils (with the exception of tropical fats). With the introduction of mandatory *trans* fat labeling on January 1, 2006, it is easier for consumers to identify and limit their *trans* fatty acid intake. However, even if partially hydrogenated fats were removed from the food supply, it is estimated that *trans* fats still would represent ≈1% of the calories because some *trans* fatty acids are produced from deodorization of vegetable oils and because meat and dairy products contain naturally occurring *trans* fatty acids.[50]

There are currently no numerical goals for *trans* fat. The Institute of Medicine recommends limiting *trans* fat intake as much as possible,[48] and both the 2005 Dietary Guidelines Advisory Committee and a recent FDA Food Advisory Committee, Nutrition Subcommittee, recommended that the intake of *trans* fat be ≤1% of energy.[50,51] (The FDA subcommittee voted [6 yes, 1 abstaining] in favor of the recommendation.) For this reason, the AHA recommends the goal of a diet containing <1% *trans* fatty acids.

The relative health effects of polyunsaturated and monounsaturated fats are actively debated. A few clinical outcome trials have documented that replacement of saturated fat with polyunsaturated fats reduces the risk of developing CHD, whereas prospective observational studies have documented that diets rich in monounsaturated fats are associated with a reduced risk of CHD. The AHA supports the recommendations of the Institute of Medicine and the National Cholesterol Education Program for total fat. A range of 25% to 35% for total fat is an appropriate level of intake in a healthy dietary pattern.

Minimize Your Intake of Beverages and Foods With Added Sugars

Over the past few decades, the consumption of beverages and foods with added sugars has risen markedly. The intake of added sugars (sucrose, corn syrup, and high-fructose corn syrup) increased from 13.1% of energy during the period 1977 to 1978 to 16.6% of energy during 1999 to 2002.[52,53]

The primary reasons for reducing the intake of beverages and foods with added sugars are to lower total calorie intake and promote nutrient adequacy.[54] Individuals who consume large amounts of beverages with added sugars tend to consume more calories and gain weight.[55–57] Some evidence suggests that calories consumed as liquid are not as satiating as calories consumed as solid food.[58] This factor may negatively affect attempts to achieve and maintain a healthy body weight.

Choose and Prepare Foods With Little or No Salt

On average, as salt (sodium chloride) intake increases, so does BP.[59,60] A reduced sodium intake can prevent hypertension in nonhypertensive individuals, can lower BP in the setting of antihypertensive medication, and can facilitate hypertension control. A reduced sodium intake is associated with a blunted age-related rise in systolic BP and a reduced risk of atherosclerotic cardiovascular events and congestive heart failure. In general, the effects of sodium reduction on BP tend to be greater in blacks; middle-aged and older-aged persons; and individuals with hypertension, diabetes, or chronic kidney disease (CKD). Diets rich in potassium lower BP and also blunt the BP-raising effects of an increased sodium intake.[59]

Because of the progressive dose-response relationship between sodium intake and BP, it is difficult to set a recommended upper level of sodium intake, which could be as low as 1.5 g/d (65 mmol/d). However, in view of the available high-sodium food supply and the currently high levels of sodium consumption, a reduction in sodium intake to 1.5 g/d (65 mmol/d) is not easily achievable at present. In the interim, an achievable recommendation is 2.3 g/d (100 mmol/d).

If You Consume Alcohol, Do So in Moderation

Moderate alcohol intake has been associated with reduced cardiovascular events in many populations.[2] This association is not only found with wine but also with other alcoholic beverages.[61,62] Unlike other potentially beneficial dietary components, the consumption of alcohol cannot be recommended solely for CVD risk reduction. Alcohol can be addictive, and high intake can be associated with serious adverse health and social consequences, including hypertriglyceridemia, hypertension, liver damage, physical abuse, vehicular and work accidents, and increased risk of breast cancer.[2]

For these reasons, and on the basis of available epidemiological data, the AHA recommends that if alcoholic beverages are consumed, they should be limited to no more than 2 drinks per day for men and 1 drink per day for women, and ideally should be consumed with meals.[63] In general, a 12-ounce bottle of beer, a 4-ounce glass of wine, and a 1½-ounce shot of 80-proof spirits all contain the same amount of alcohol (one half ounce). Each of these is considered a "drink equivalent."[63,64]

Individuals who choose to consume alcoholic beverages should also be aware that alcohol has a higher caloric density than protein and carbohydrate and is a source of additional "empty" calories.

When You Eat Food That Is Prepared Outside of the Home, Follow the AHA 2006 Diet and Lifestyle Recommendations

Increasingly, Americans consume food that is prepared outside of the home. Such types of "away" food include food prepared at restaurants and grocery stores, quick-serve establishments, schools and daycare centers, and other non-home locations. Between 1977 to 1978 and 1994 to 1996, consumption of away food increased from 18% to 32% of calories.[65] Large portion sizes and high energy density are common features of away food.[66] Many types of away foods, particularly traditional quick-serve, are also high in saturated fat, *trans* fatty acids, cholesterol, added sugars, and sodium and low in fiber and micronutrients. Adverse health consequences have emerged. There is a positive association between frequency of meal consumption at quick-serve restaurants and total energy intake, weight gain, and insulin resistance.[67] Attainment of a healthy diet will require individuals to make wise choices when they eat food prepared outside of the home.

Dietary Factors With Unproven or Uncertain Effects on CVD Risk

Antioxidant Supplements

Antioxidant vitamin supplements or other supplements such as selenium to prevent CVD are not recommended.[68,69] Although observational studies have suggested that high intakes of antioxidant vitamins from food and supplements are associated with a lower risk of CVD, clinical trials of antioxidant vitamin supplements have not confirmed benefit. Some trials, in fact, have documented potential harm, including an increased risk of lung cancer from beta-carotene supplements in smokers and an increased risk of heart failure[70] and the possibility of increased total mortality[71] from high-dose vitamin E supplements. Although antioxidant supplements are not recommended, food sources of antioxidant nutrients, principally from a variety of plant-derived foods such as fruits, vegetables, whole grains, and vegetable oils are recommended.

Soy Protein

Evidence of a direct cardiovascular health benefit from consuming soy protein products instead of dairy or other proteins or of isoflavone supplements is minimal.[71,72] Although earlier research has suggested that soy protein has clinically important favorable effects on LDL cholesterol levels and other CVD risk factors, studies reported during the past 5 years have not confirmed those results.[72] A very large amount of soy protein, comprising more than half of daily protein intake, may lower LDL cholesterol levels by a few percentage points when it replaces dairy protein or a mixture of animal proteins, but data are mainly from hypercholesterolemic individuals. The evidence favors soy protein rather than soy isoflavones as the responsible nutrient.[76] No meaningful benefit of soy consumption is evident with regard to HDL cholesterol, triglycerides, or lipoprotein(a). Nevertheless, consumption of soy protein–rich foods may indirectly reduce CVD risk if they replace animal and dairy products that contain saturated fat and cholesterol.

Folate and Other B Vitamins

Available evidence is inadequate to recommend folate and other B vitamin supplements as a means to reduce CVD risk at this time. Folate intake and to a lesser extent intake of vitamins B6 and B12 are inversely associated with blood homocysteine levels. In observational studies, increased blood levels of homocysteine are associated with an increased risk of CVD.[77] Trials of homocysteine-reducing vitamin therapy have been disappointing, however.[78–82]

Phytochemicals

Flavonoids and sulfur-containing compounds are classes of compounds found in fruits and vegetables that may be important in reducing the risk of atherosclerosis. Within these categories are multiple possible compounds, most of which are not well characterized and whose modes of action are not established.[83] Until more of this information is gathered and fully understood, a diet consistent with AHA recommendations (Table 2) is the most prudent way to ensure optimum consumption of macronutrients, micronutrients, and associated bioactive compounds.[32]

Other Dietary Factors That Affect CVD Risk

Fish Oil Supplements

Fish intake has been associated with decreased risk of CVD.[83,84] On the basis of the available data, the AHA recommends that patients without documented CHD eat a variety of fish, preferably oily fish, at least twice a week.[42] Patients with documented CHD are advised to consume ≈1 g of EPA+DHA per day, preferably from oily fish, although EPA+DHA supplements could be considered in consultation with their physician. For individuals with hypertriglyceridemia, 2 to 4 g of EPA+DHA per day, provided as capsules under a physician's care, are recommended.[42]

Plant Stanols/Sterols

Plant stanols/sterols lower LDL cholesterol levels by up to 15%[85] and therefore are seen as a therapeutic option, in addition to diet and lifestyle modification, for individuals with elevated LDL cholesterol levels. Maximum effects are observed at plant stanol/sterol intakes of ≈2 g per day. Plant stanol/sterols are currently available in a wide variety of foods, drinks, and soft gel capsules. The choice of vehicle should be determined by availability and by other considerations, including caloric content. To sustain LDL cholesterol reductions from these products, individuals need to consume them daily, just as they would use lipid-lowering medication.

Special Groups

Children Over 2 Years of Age

Overweight and obesity are a particular concern for children as the prevalence of overweight is now ≈16% for children and adolescents. Achieving energy balance may be more complicated in children and adolescents because caloric and

TABLE 5. High-Priority Recommendations to Facilitate Adoption of AHA 2006 Diet and Lifestyle Recommendations

Target Group	Recommendations
Practitioners	Advocate a healthy dietary pattern consistent with AHA recommendations.
	Encourage regular physical activity.
	Calculate BMI and discuss results with patients.
	Discourage smoking among nonsmokers and encourage smoking cessation among patients who do smoke.
	Encourage moderation of alcohol intake among those who do drink alcohol.
Restaurants	Display calorie content prominently on menus, or make calorie and other nutrition information easily accessible to consumers at point of decision and point of purchase.
	Reduce portion sizes and provide options for selecting smaller portions.
	Reformulate products to reduce calories, sodium, and saturated and *trans* fats.
	Use *trans* fat–free and low–saturated fat oils in food preparation to eliminate added *trans* fat without increasing saturated fat.
	Provide more vegetable options, and prepare them with minimal added calories and salt.
	Provide more fruit options, and serve them without added sugar.
	Develop creative approaches to including and marketing fruits and vegetables to make them more attractive to consumers.
	Allow substitution of nonfried and low-fat vegetables for usual side dishes (eg, French fries and potato salad).
	Provide whole-grain options for bread, crackers, pasta and rice.
Food industry	Reduce the salt and sugar content of processed foods.
	Replace saturated and *trans* fats in prepared foods and baked goods with low–saturated fat liquid vegetable oils.
	Increase the proportion of whole-grain foods available.
	Package foods in smaller individual portion sizes.
	Develop packaging that allows for greater stability, preservation, and palatability of fresh fruits and vegetables without added sodium and reduces refrigeration needs in grocery stores.
Schools	Adopt competitive food policies that limit foods high in added sugar, saturated and *trans* fat, sodium, and calories while encouraging consumption of fruits, vegetables, whole-grain foods, and low-fat or fat-free dairy. (Competitive food policies should address vending, a la carte, school stores, fundraising, and all food sold outside of the reimbursable school lunch.)
	Ensure the availability daily of heart-healthy lunches to students and staff by meeting USDA nutrition standards, offering nonfried fish as a regular menu item, and offering at least 1 meal/day low in saturated and *trans* fat.
	Offer and require daily physical education taught by qualified teachers at all grade levels.
	Expand physical activity opportunities by providing noncompetitive as well as competitive extracurricular physical activity options. Examples include intermural and intramural sports, dance classes, and walking clubs.
	Incorporate healthy nutrition and increased physical activity policy into after-school activities.
	Adopt 100% smoke-free policies on school campus, including parking lots and surrounding school grounds.
Local government	Develop and implement a Safe Routes to School plan.
	Implement land-use practices that promote nonmotorized transportation (walking and biking), such as complete streets and community parks.
	Promote policies that increase availability of healthy foods (eg, use of public land for farmers' markets and full-service grocery stores in low-income areas).

micronutrient intake must be adequate to support normal growth and development. However, many children are eating excess calories and experiencing unhealthy weight gain. Children can eat a diet consistent with the AHA 2006 Diet and Lifestyle Recommendations and maintain appropriate growth while lowering risk for future CVD. Furthermore, because diet in youth is associated with the occurrence of CVD outcomes later in life and because lifestyle habits in youth track into adulthood, adoption of a healthy diet and lifestyle at early ages is recommended. More specific guidance is provided in a separate AHA diet statement for children.[3]

Older Adults

Atherosclerosis is a chronic process beginning in youth. The risk of developing CVD increases dramatically with advancing age. Diet and lifestyle behaviors can decrease CVD risk.[86] Also, ample evidence from clinical trials indicates that older-aged persons can make and sustain lifestyle changes, perhaps more so than younger adults.[86,87] Because of the high incidence of CVD events in older-aged individuals, even relatively small improvements in risk factors (eg, small reductions in BP and LDL cholesterol through diet and lifestyle changes) should be of substantial benefit.[88,89] In general, the goals and recommendations described in this document are appropriate for older-aged individuals. Because they have decreased energy needs while their vitamin and mineral requirements remain constant or increase, however, older individuals should be counseled to select nutrient-dense choices within each food group.[90]

Persons With Metabolic Syndrome

Metabolic syndrome refers to a cluster of abnormalities that are related to insulin resistance and that commonly occur in

the setting of overweight and obesity.[91] Characteristic features of the metabolic syndrome are abdominal obesity, atherogenic dyslipidemia (elevated triglycerides, low HDL cholesterol), increased BP, insulin resistance (with or without glucose intolerance), and prothrombotic and proinflammatory states.[17,91] The primary approach to reducing CVD risk in persons with the metabolic syndrome is to control the individual risk factors by diet and lifestyle intervention.[85] Physical activity and weight maintenance are recommended as a means to prevent the development of metabolic syndrome and lower the risk of developing type 2 diabetes or CHD.[91] Very low-fat diets should be avoided if elevated triglyceride or depressed HDL cholesterol levels are present.[92] Reducing caloric intake while maintaining a moderate-fat diet and increasing physical activity to achieve even a modest weight loss can improve insulin resistance and the concomitant metabolic abnormalities.

Persons With Chronic Kidney Disease

CKD, which precedes end-stage kidney disease, substantially increases the risk of CVD, at least in part through diet-related CVD risk factors.[93] CKD is associated with a high prevalence of diabetes, dyslipidemia (especially hypertriglyceridemia), and hypertension. Dietary therapies recommended for the general population are also recommended for persons with early stages of CKD, even though empiric evidence is sparse. In particular, a reduced salt intake is recommended as a means to reduce BP and prevent fluid overload, and dietary strategies to manage dyslipidemia are also recommended. Replacing meat with dairy and vegetable alternatives may also slow loss of kidney function.[94] At advanced stages of CKD, the dietary management of CKD diverges from general population recommendations; in particular, a reduced intake of protein, phosphorus, and potassium is recommended.

Socioeconomic Groups at High Risk of CVD

It is well recognized that individuals of lower socioeconomic status have a higher incidence of CVD than do individuals of higher socioeconomic status. Population subgroups of racial/ethnic minorities (eg, Mexican Americans, American Indians, and blacks), who are overrepresented in lower socioeconomic status groups, have a strikingly high prevalence of overweight and obesity—a condition that precedes the development of many other CVD risk factors.[95,96] Although the reasons for such disparities are complex and multifactorial, available research is sufficient to advocate diet and lifestyle changes as a means to reduce disparities. For example, blacks are especially sensitive to the BP-lowering effects of a reduced salt intake, increased potassium intake, and the DASH diet.[6]

Promotion of a desirable diet should be culturally sensitive and should encourage healthy preparation of traditional ethnic foods. Unfortunately, social and economic barriers make widespread adoption of current diet and lifestyle recommendations difficult for many segments of society. Targeted diet and lifestyle messages directed at ethnic minorities and policies that affect availability and affordability are critically needed to reduce CVD health disparities.

Environmental Influences on CVD Health Behaviors

Ultimately, people select the types and amount of food they eat and the amount of physical activity they perform. Still, the environment has a powerful influence on whether people consume excess calories, follow a healthy diet, and are physically active. By environment, we mean the constellation of cultural forces, societal norms, and commercial interests that influence the behavior of individuals.

The obesity epidemic, which has unfolded over the past 2 decades in genetically stable populations, illustrates the adverse impact of environment on diet and lifestyle behaviors. In brief, it is well recognized that the current environment encourages overconsumption of calories and discourages expenditure of energy. There is a growing agreement among experts that changes in the environment are a major driving force behind the obesity epidemic.[97] Environmental factors that contribute to excess calorie intake are increased portion sizes, high-calorie foods, and easy access to plentiful inexpensive food. Environmental factors that discourage physical activity include an environment that encourages automobile use rather than walking and that has few cues to promote activity and numerous cues that discourage activity (eg, poor pedestrian infrastructure, lack of sidewalks and other safety features, and poor street aesthetics). Other factors include reduced energy expenditures at school, work, and home, and increased time spent on sedentary activities such as watching television, using computers, and playing video games.

The effects of environmental factors and of individual nutrients and food groups on overweight and obesity (eg, role of fat, added sugars, alcohol, fruits and vegetables, dairy products, physical inactivity) have been explored. No one factor appears responsible for the epidemic. Such findings reinforce the belief that multiple factors are responsible for the obesity epidemic and that the optimal strategy to arrest the epidemic will be multifactorial. Because many of these factors are beyond the control of individuals (eg, size of portions served in restaurants, lack of information on calorie content at point of purchase, presence of sidewalks, adequate streetlights after dark), substantial changes to the environment will be required. Furthermore, the obesity epidemic highlights the importance of primary prevention efforts in children so that adverse diet and lifestyle behaviors do not become habits.

For individuals to adhere to a healthy diet and lifestyle, the AHA Nutrition Committee strongly believes that substantial changes to the environment must occur. In its deliberations, the Nutrition Committee identified several changes that it considers high priority and that should help achieve the AHA's strategic goals of reducing CVD risk in the general population. Not surprisingly, several target groups are involved. A list of the changes by target group is presented in Table 5.

Conclusions

A substantial and expanding body of evidence has implicated several aspects of diet in the pathogenesis of CVD and its risk factors. Importantly, lifestyle modifications can effectively

control CVD risk factors and lower CVD risk. To realize these benefits, individuals should aim for a desirable body weight, be physically active, avoid tobacco exposure, and follow a diet and lifestyle consistent with AHA dietary recommendations as stated in this report. Accomplishing these objectives will require individuals to change their behavior and society to make substantial environmental changes. The current challenge to healthcare providers, researchers, and government officials is to develop and implement effective clinical and public health strategies that lead to sustained lifestyle changes among individuals and, more broadly, among populations.

Appendix

Resources

Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7): http://www.nhlbi.nih.gov/guidelines/hypertension/jnc7full.htm

The Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents: http://www.nhlbi.nih.gov/health/prof/heart/hbp/hbp_ped.htm

The DASH Eating Plan: http://www.nhlbi.nih.gov/health/public/heart/hbp/dash

Behavioral Intervention program from the PREMIER trial (designed to increase physical activity, lose weight, and accomplish the DASH diet): http://www.kpchr.org/public/premier/intervention

Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (describes panel's recommendations for Therapeutic Lifestyle Changes [TLC], a multifactorial lifestyle approach to reducing risk for CHD): http://www.nhlbi.nih.gov/guidelines/cholesterol/atp3_rpt.htm

Risk Assessment Tool for Estimating Your 10-Year Risk of Having a Heart Attack: http://hin.nhlbi.nih.gov/atpiii/calculator.asp?usertype=pub

Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: http://www.nhlbi.nih.gov/guidelines/obesity/ob_gdlns.htm

The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: http://www.nhlbi.nih.gov/guidelines/obesity/practgde.htm

Calculate Your Body Mass Index: http://www.nhlbisupport.com/bmi/bmicalc.htm

Interactive Menu Planner: http://hin.nhlbi.nih.gov/menuplanner/menu.cgi

Portion Distortion: http://hin.nhlbi.nih.gov/portion

Palm and Download Tools

Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7): http://hin.nhlbi.nih.gov/jnc7/jnc7pda.htm

ATP III Cholesterol Management Implementation Tool for Palm: http://hin.nhlbi.nih.gov/atpiii/atp3palm.htm

Ten-Year Risk Assessment Tool: http://hin.nhlbi.nih.gov/atpiii/riskcalc.htm

BMI Calculator: http://hin.nhlbi.nih.gov/bmi_palm.htm

Obesity Education Initiative Guidelines Implementation Tool: http://hin.nhlbi.nih.gov/obgdpalm.htm

Dietary Guidelines for Americans 2005 (In addition to the guidelines, link contains several other links to tools and other resources on diet and physical activity.): http://www.healthierus.gov/dietaryguidelines

USDA National Nutrient Database (nutrient content of individual foods): http://www.nal.usda.gov/fnic/foodcomp/Data

What You Need to Know About Mercury in Fish and Shellfish: http://www.cfsan.fda.gov~dms/admehg3.html

Your Guide to Lowering Blood Pressure with DASH. http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/index.htm

American Heart Association Cookbooks

American Heart Association's No-Fad Diet Book
The New American Heart Association Cookbook, 7th Edition
American Heart Association One-Dish Meals
American Heart Association Low-Salt Cookbook
American Heart Association Meals in Minutes Cookbook
American Heart Association Quick & Easy Cookbook

AHA Web Sites

American Heart Association: www.americanheart.org

American Heart Association Council on Nutrition, Physical Activity, and Metabolism: http://www.americanheart.org/presenter.jhtml?identifier=650

Easy Food Tips for Heart-Healthy Eating: http://www.americanheart.org/presenter.jhtml?identifier=9033

Diet & Nutrition: http://www.americanheart.org/presenter.jhtml?identifier=1200010

Nutrition Facts: http://www.americanheart.org/presenter.jhtml?identifier=855

Council on Nutrition, Physical Activity and Metabolism Hot Links: http://www.americanheart.org/presenter.jhtml?identifier=1160

Nutrition and Cardiovascular Disease—Statistics: http://www.americanheart.org/presenter.jhtml?identifier=3020707

AHA Comment: FDA's new nutrition labeling requirement for *trans* fatty acids: http://www.americanheart.org/presenter.jhtml?identifier=3013636

AHA Scientific Statements on Diet/Nutrition: http://www.americanheart.org/presenter.jhtml?identifier=3004604

Physical Activity, Nutrition & School Health Policy (State-by-State Research): http://www.americanheart.org/presenter.jhtml?identifier=3019642

Nutrition materials in Spanish: http://www.americanheart.org/presenter.jhtml?identifier=3003430

Disclosures

TABLE 6. Relationships With Industry—AHA Writing Group to Develop Diet and Lifestyle Recommendations

Writing Group Member	Employment	Research Grant	Other Research Support	Speakers' Bureau/Honoraria	Ownership Interest	Consultant/Advisory Board	Other
Alice H. Lichtenstein	Tufts University	NIH	None	None	None	None	None
Lawrence J. Appel	Johns Hopkins University	None	None	None	None	None	None
Michael Brands	Medical College of Georgia	None	None	None	None	None	None
Mercedes Carnethon	Northwestern University	None	None	None	None	None	None
Stephen Daniels	University of Cincinnati	None	None	None	None	Abbott Laboratories; Able Laboratories	None
Harold A. Franch	Atlanta VA Medical Center, Emory University	NIH, Department of Veterans Affairs	None	None	None	None	None
Barry Franklin	William Beaumont Hospital, Royal Oak, Mich	None	None	None	None	None	American College of Sports Medicine; American Association of Cardiovascular and Pulmonary Rehabilitation
Penny Kris-Etherton	Penn State	Dairy Council; California Pistachio Board	None	Sunflower Association	None	McNeil	None
William S. Harris	St. Luke's Hospital	None	None	None	None	None	None
Barbara Howard	MedStar Research Institute	None	Donation of drugs: Pfizer, Merck, Schering-Plough	Lectures for Schering-Plough	None	Merck, Egg Nutrition Council, General Mills	None
Njeri Karanja	Kaiser Permanente	None	None	None	None	None	None
Michael Lefevre	Pennington Biomedical Research Center	General Mills, includes salary support (PI); Hershey Foods, includes salary support (Co-PI)	None	None	None	Kraft Foods; Member, Global Health and Wellness Advisory Board; International Life Sciences Institute: Scientific Advisor, Technical Committee on Fatty Acids	None
Lawrence Rudel	Wake Forest School of Medicine	None	Lipid Sciences contract research	Merck	None	TAP Pharmaceuticals	None
Frank M. Sacks	Harvard School of Public Health	None	None	None	None	None	None
Linda Van Horn	Northwestern University	None	None	None	None	None	None
Mary Winston	American Heart Association	None	None	None	None	None	None
Judith Wylie-Rosett	Albert Einstein College of Medicine at Yale University	Atkins Foundation	None	None	None	Frito-Lay (resigned)	None

This table represents the relationships of writing group members that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all members of the writing group are required to complete and submit.

TABLE 7. Relationships With Industry—External Peer Reviewers for the AHA 2006 Diet and Lifestyle Guidelines

Reviewer	Employment	Research Grant	Other Research Support	Speakers Bureau/Honoraria	Ownership Interest	Consultant/Advisory Board	Other
Benjamin Caballero	Johns Hopkins University Center for Human Nutrition	None	None	None	None	None	None
Robert M. Carey	University of Virginia	NIH	None	None	None	Novartis	None
Scott M. Grundy	University of Texas Southwestern Medical Center at Dallas	Merck, Abbott, Kos	None	Merck, Pfizer, Sankyo, Schering Plough, Kos, Abbott, Fournier, Bristol-Myers Squibb, AstraZeneca	None	None	None
Janet C. King	Children's Hospital Oakland Research Institute	National Dairy Council	None	None	None	None	None
Russell R. Pate	University of South Carolina	NIH and CDC	None	National Association of School Boards of Education, Kansas State University, Penn State University, Kansas University School of Medicine, Maine Center for Public Health, University of Georgia	None	NIH, CDC, Chartwells, Kraft Foods, and Porter Novelli (Bone Health)	None

This table represents the relationships of reviewers that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all reviewers are required to complete and submit.

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