REVIEW

CME CREDIT

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Strengthening the standards for preventing heart disease and stroke: The recent AHA guidelines

ABSTRACT

Recent American Heart Association guidelines to prevent cardiovascular disease and stroke call for managing risk factors more aggressively than ever before, especially in people identified as being at high risk.

KEY POINTS

Low-dose aspirin is recommended for people at high risk of heart disease, ie, a 10-year risk of more than 10% as estimated using the Framingham risk score.

Lipid-lowering drugs should be started if therapeutic lifestyle changes fail to lower the low-density lipoprotein cholesterol concentration to the goal level within 12 weeks; goal levels depend on the patient's level of risk.

At least 30 minutes of moderate-intensity physical activity most days of the week is now recommended, vs the 3 or 4 days recommended previously.

The body mass index should be 18.5 to 24.9 kg/m^2, although it may be higher in very muscular people who are not obese. If it is greater than 25 kg/m^2, the waist circumference should not exceed 40 inches for men or 35 inches for women.

For patients with chronic or intermittent atrial fibrillation, it is critical to achieve and maintain normal sinus rhythm.

Hormone replacement therapy should not be used for primary prevention of heart disease.

PATIENTS AT HIGHER RISK of cardiovascular events—such as those with diabetes or various risk factors—need to be treated earlier and more aggressively. That is the message of the revised guidelines for primary prevention of cardiovascular disease and stroke from the American Heart Association (AHA),[1] issued in 2002, which supersede its previous guidelines issued in 1997.[2]

The new guidelines incorporate findings of a number of recommendations published in the last few years by other groups, such as the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 6)[3] and the Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III).[4]

While the AHA guidelines parallel many other guidelines, they differ from others as well, and this article will explore the guidelines and some of the current controversies.[3–9]

The challenge for health care professionals is to routinely and effectively incorporate these recommendations into their daily practice so as to lower cardiovascular risk in their patients.

ASSESS RISK ON A REGULAR BASIS

The new AHA guidelines call for screening for risk factors on a regular basis, beginning at age 20.

TABLE 1

How to calculate 10-year risk of coronary events

1 DETERMINE THE PATIENT'S TOTAL POINTS

AGE (YEARS)	POINTS	
	MEN	WOMEN
20–34	–9	–7
35–39	–4	–3
40–44	0	0
45–49	3	3
50–54	6	6
55–59	8	8
60–64	10	10
65–69	11	12
70–74	12	14
75–79	13	16

TOTAL CHOLESTEROL (MG/DL)	POINTS									
	AGE 20–39		AGE 40–49		AGE 50–59		AGE 60–69		AGE 70–79	
	M	W	M	W	M	W	M	W	M	W
< 160	0	0	0	0	0	0	0	0	0	0
160–199	4	4	3	3	2	2	1	1	0	1
200–239	7	8	5	6	3	4	1	2	0	1
240–279	9	11	6	8	4	5	2	3	1	2
≥ 280	11	13	8	10	5	7	3	4	1	2

SMOKING STATUS	POINTS									
	AGE 20–39		AGE 40–49		AGE 50–59		AGE 60–69		AGE 70–79	
	M	W	M	W	M	W	M	W	M	W
Nonsmoker	0	0	0	0	0	0	0	0	0	0
Smoker	8	9	5	7	3	4	1	2	1	1

HDL (MG/DL)	POINTS, MEN AND WOMEN
≥ 60	–1
50–59	0
40–49	1
< 40	2

SYSTOLIC BLOOD PRESSURE (MM HG)	POINTS			
	IF UNTREATED		IF TREATED	
	M	W	M	W
< 120	0	0	0	0
120–129	0	1	1	3
130–139	1	2	2	4
140–159	1	3	2	5
≥ 160	2	4	3	6

2 DETERMINE THE PATIENT'S 10-YEAR RISK

PATIENT'S POINTS	
Age	_____
Total cholesterol	_____
Smoking	_____
HDL	_____
Systolic blood pressure	_____
Total points	_____

POINT TOTAL	10-YEAR RISK (%)	
	MEN	WOMEN
< 0	< 1	< 1
0–4	1	< 1
5–6	2	< 1
7	3	< 1
8	4	< 1
9	5	1
10	6	1
11	8	1
12	10	1
13	12	2
14	16	2
15	20	3
16	25	4
17	30	5
18	> 30	6
19	> 30	8
20	> 30	11
21	> 30	14
22	> 30	17
23	> 30	22
24	> 30	27
≥ 25	> 30	≥ 30

ADAPTED FROM EXPERT PANEL ON DETECTION, EVALUATION, AND TREATMENT OF HIGH BLOOD CHOLESTEROL IN ADULTS. EXECUTIVE SUMMARY OF THE THIRD REPORT OF THE NATIONAL CHOLESTEROL EDUCATION PROGRAM (NCEP) EXPERT PANEL ON DETECTION, EVALUATION, AND TREATMENT OF HIGH BLOOD CHOLESTEROL IN ADULTS (ADULT TREATMENT PANEL III). JAMA 2001; 285:2486–2497.

The calculator can be downloaded at **www.nhlbi.nih.gov/guidelines/cholesterol/index.htm.**

To be checked at least every 2 years:

- Blood pressure
- Body mass index and waist circumference
- Pulse (to screen for atrial fibrillation)

To be checked at least every 5 years (every 2 years if the patient is thought to be at increased risk):

- Fasting lipid profile
- Fasting blood glucose level.

To be checked at every routine evaluation:

- Smoking status
- Diet
- Alcohol intake
- Level of physical activity
- Current family history of coronary heart disease.

The absolute 10-year risk of a coronary disease event should be calculated every 5 years (or more frequently if risk factors change), starting at age 40 (or sooner in patients with two or more risk factors), using the Framingham risk scoring system (TABLE 1).[10] People with diabetes or a 10-year risk greater than 20% have a level of risk similar to those with established coronary heart disease; therefore, diabetes is considered a "coronary heart disease risk equivalent."

A similar scoring system for calculating the 10-year risk of stroke is available.[11]

All adults should know the level and significance of their risk factors so they and their physicians can formulate a lifelong plan to modify the factors that are modifiable.

Risk factor screening should start at age 20

GOALS AND INTERVENTIONS

Smoking

The goal is to stop smoking completely—not just to cut down.

At each visit, physicians should ask patients if they are smoking and if they are willing to quit, and if so, they should help them make a plan to quit.

In addition, the new guidelines also recommend assessing patients' exposure to secondhand smoke and urging them to avoid it at work and at home.

Blood pressure

The goal is less than 140/90 mm Hg for most people, but lower for certain groups, ie, less than 130/85 for people with renal insufficiency or chronic heart failure and less than 130/80 for people with diabetes.

These recommendations are consistent with those of the 1998 JNC 6 report.[3] The 2003 JNC 7 report,[12] released after the AHA guidelines, goes even farther, however: the goal is now less than 130/80 mm Hg for people with chronic kidney disease, as well.

Furthermore, JNC 7 classifies people with blood pressure of 120/80 to 139/89 mm Hg as having *prehypertension* and recommends lifestyle modifications for them. In fact, lifestyle modifications are "encouraged" even for people with blood pressure lower than 120/80 mm Hg.

Lifestyle modifications recommended by the National High Blood Pressure Education Program[13] for preventing hypertension include moderate physical activity, maintaining a normal body weight, limiting alcohol intake, maintaining an adequate intake of potassium, reducing dietary intake of sodium, and following a diet rich in fruits and vegetables and dairy products that are low in saturated and total fat.

Aspirin use

In a departure from the original guidelines, the new AHA guidelines recommend low-dose aspirin (75–160 mg/day) for people at high risk of cardiovascular disease or stroke or with a Framingham 10-year risk of more than 10%.

This differs slightly from the US Preventive Services Task Force[8] recommendation of aspirin for persons with a 10-year risk of only 6% or more.

Some clinicians, such as Lauer,[14] argue that in patients who are at intermediate risk, ie, who have a 10-year risk of 7%–14%, other factors need to be considered. These factors include patient preference, the level of physical fitness, and the presence of diabetes or hypertension with end-organ damage. Another important consideration is the risk of gastrointestinal bleeding with aspirin.

Lipid management

The new AHA guidelines incorporate the findings of the Adult Treatment Panel III report, published in 2001,[4] which have been

TABLE 2

Updated American Heart Association goals to lower risk of heart disease and stroke

Smoking
- Quit completely
- Avoid secondhand smoke

Blood pressure
- < 140/90 mm Hg
- < 130/85 if renal insufficiency or chronic heart failure is present
- < 130/80 if diabetes is present

Diet
- Overall healthy eating pattern
- Saturated fats < 10% of calories
- Cholesterol < 300 mg/day
- Salt < 3 g/day
- Alcohol < 2 drinks/day in men and < 1 in women

Aspirin use
- Low dose in people at high risk for coronary heart disease or with a 10-year risk > 10%

Lipid levels
- With one risk factor:
  - LDL-C < 160 mg/dL; non-HDL-C < 190 mg/dL
- With two or more risk factors and 10-year coronary heart disease risk < 20%:
  - LDL-C, < 130 mg/dL; non-HDL-C, < 160 mg/dL
- With two or more risk factors and 10-year coronary heart disease risk > 20% or with diabetes:
  - LDL-C < 100 mg/dL, non-HDL-C < 130 mg/dL
- Triglycerides < 150 mg/dL
- HDL-C > 40 mg/dL (men) or > 50 mg/dL (women)

Exercise
- At least 30 minutes of moderate intensity most days of the week

Weight management
- Body mass index 18.5–24.9 kg/m^2
- If body mass index is > 25 kg/m^2, waist circumference < 40 (men) or < 35 (women)

Diabetes management
- Fasting (preprandial) plasma glucose level 90–130 mg/dL
- Postprandial plasma glucose < 180 mg/dL
- Hemoglobin A_{1C} level < 7%

Chronic atrial fibrillation
- Normal sinus rhythm
- If atrial fibrillation is chronic, warfarin to maintain the international normalized ratio at 2.0–3.0

HDL-C = high-density-lipoprotein cholesterol, LDL-C = low-density-lipoprotein cholesterol

ADAPTED FROM PEARSON TA, BLAIR SN, DANIELS SR, ET AL. AHA GUIDELINES FOR PRIMARY PREVENTION OF CARDIOVASCULAR DISEASE AND STROKE: 2002 UPDATE. CIRCULATION 2002; 106:388–391.

reviewed by Sprecher and Frolkis.[15] The guidelines call for drug therapy if therapeutic lifestyle changes fail to lower the low-density lipoprotein cholesterol (LDL-C) concentration to the goal level within 12 weeks.

The primary goal, ie, the **LDL-C** level, depends on the patient's level of risk (**TABLE 2**):
- With no risk factors or one risk factor: less than 160 mg/dL
- With two or more risk factors and a 10-

year risk less than 20%: less than 130 mg/dL
- With two or more risk factors and a 10-year risk greater than 20% or with diabetes: less than 100 mg/dL.

Secondary goals.
- Non-high-density lipoprotein cholesterol (non-HDL-C): 30 mg/dL higher than the LDL-C goal. Non-HDL-C is LDL-C plus very low-density lipoprotein cholesterol; it should be used as a secondary goal in patients with high triglyceride levels (> 200 mg/dL) and LDL-C in the goal range.
- Total cholesterol: less than 200 mg/dL
- Triglycerides: less than 150 mg/dL
- HDL-C: greater than 40 mg/dL (men) or 50 mg/dL (women).

Physical activity

Most people should aim for 30 minutes of moderate-intensity physical activity most (preferably all) days of the week, rather than the 3 or 4 days that were recommended previously. This guideline is consistent with the US Surgeon General's report on physical activity and health.[16]

The goal blood pressure is less than 140/90 mm Hg, or 130/80 in those with diabetes

Moderate-intensity physical activity is defined as using 40% to 60% of maximum lung capacity—the equivalent of walking at 3 to 4 miles per hour. Low-to-moderate intensity activities also include climbing stairs, gardening, yard work, moderate-to-heavy housework, and dancing.

Although moderate-intensity activity is recommended, greater benefits are seen with activities that are more vigorous (ie, that use > 60% of maximum lung capacity). Vigorous activities include brisk walking, running, swimming, bicycling, roller skating, and jumping rope. Resistance training and flexibility exercises are also recommended.

Weight management

The goal is a body mass index of 18.5 to 24.9 kg/m^2 (body mass index is calculated by dividing the weight in kilograms by the square of the height in meters [kg/m^2]). However, some people have a higher body mass index because they are muscular, not fat. Therefore, for patients with a body mass index greater than 25 kg/m^2, the new guidelines suggest that the waist circumference measured at the iliac crest level should be less than 40 inches in men and less than 35 inches in women.

This recommendation is consistent with the evidence-based guidelines on obesity from the National Institute of Health (NIH). Janssen et al[17] recently validated the NIH guidelines using the waist circumference to identify increased health risk. With few exceptions, men with a waist circumference greater than 40 inches and women with a waist circumference greater than 35 inches were more likely to have hypertension, diabetes, hyperlipidemia, and metabolic syndrome than those with a smaller waist—even in those who were of normal weight (body mass index 18.4–24.9) or slight or moderately overweight (body mass index 25.0–29.9) rather than obese.

Diabetes management

The goal is a normal fasting plasma glucose level and a near-normal hemoglobin A_{1c} level. The American Diabetes Association recently published a position statement on medical issues related to diabetes.[18] Recommended glycemic goals for nonpregnant adult diabetics include a hemoglobin A_{1c} level lower than 7.0%, preprandial plasma glucose level 90 to 130 mg/dL, and a postprandial plasma glucose level of less than 180 mg/dL (measurements made 1–2 hours after beginning a meal). Other notable goals in diabetic patients are to keep the blood pressure lower than 130/80 mm Hg and the LDL-C level lower than 100 mg/dL.

Of note, normoglycemia is now defined as a fasting plasma glucose value lower than 100 mg/dL and a 2-hour postload value lower than 140 mg/dL in the 75-g oral glucose tolerance test. Impaired fasting glucose (100–125 mg/dL) and impaired glucose tolerance (140–199 mg/dL) are now termed prediabetes, and incur an increased risk for future diabetes and cardiovascular disease.[18]

Dietary intake

The goal is an overall healthy eating pattern high in fruits, vegetables, grains, low-fat or nonfat dairy products, fish, legumes, poultry, lean meats, and nuts. The new guidelines specify reducing saturated fats to less than 10% of calories and cholesterol to less than

300 mg/day, reducing trans-fatty acids, limiting sodium intake to less than 2.4 g/day, and keeping alcohol intake to two or fewer drinks per day for men and one drink for women.

Chronic atrial fibrillation

In a new recommendation, the goal is now to achieve a normal sinus rhythm. An electrocardiogram should be used to verify an irregular pulse, and conversion should be undertaken for appropriate individuals.

However, the Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM) study[19] was released after the new AHA guidelines. In a large randomized, multicenter study of more than 4,000 patients, investigators compared rate-control and rhythm-control strategies for treatment of atrial fibrillation in patients who were at high risk for stroke or death. The strategy of restoring and maintaining sinus rhythm had no clear survival advantage over the strategy of controlling the ventricular rate and allowing atrial fibrillation to persist. The authors concluded that "rate control should be considered a primary approach to therapy and that rhythm control, if used, may be abandoned early if it is not fully satisfactory."

Anticoagulation with warfarin to maintain an international normalized ratio of 2.0 to 3.0 (target 2.5) is recommended for those with chronic or intermittent atrial fibrillation. Aspirin can be used in patients with contraindications to warfarin or who are younger than 65 years without high risk. Keep in mind that patients with nonrheumatic atrial fibrillation have different stroke risks and thus differ in the anticoagulation benefits they may derive from warfarin.[20,21]

Hormone replacement therapy

The Women's Health Initiative study[9] found no benefit in using hormone replacement therapy to prevent first coronary events in postmenopausal women. In this NIH-sponsored, randomized trial, more than 16,000 women received either placebo or a combination of conjugated equine estrogens 0.625 mg/day plus medroxyprogesterone acetate 2.5 mg/day. The trial was projected to last 8.5 years, but it was stopped after 5.2 years because the hormone therapy group demonstrated an increased risk of coronary heart disease events (nonfatal myocardial infarction and coronary heart disease death), stroke, pulmonary embolism, and breast cancer.

The AHA advises that the hormone therapy regimen studied should not be initiated or continued for the primary prevention of coronary heart disease. The other arm of the Women's Health Initiative study (estrogen alone vs placebo) is ongoing.

RAISING THE BAR ON RISK-FACTOR MANAGEMENT

Since the last update of the AHA guidelines, a rapidly expanding body of evidence has clarified our goals for managing such common conditions as hypertension, hyperlipidemia, diabetes, and obesity. The challenge of these guidelines is to identify patients at risk for cardiovascular disease and to use a combination of interventions to modify this risk.

Saturated fats should supply less than 10% of dietary calories

Physicians need to develop a plan with their patients for a lifetime of preventive measures in diet, exercise, smoking cessation, alcohol limitation, and weight reduction. Similarly, health systems must refine their office-based practices for managing patients with multiple risk factors,[22] and communities need to take a population-based approach to promoting risk factor identification and lifestyle change.

It is our hope that, with work on all of these fronts, we can prevent—rather than merely treat—cardiovascular disease and stroke.

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