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Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women: 2007 Update

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*Representing the following participating organizations and major cosponsors: the American Heart Association (L.M., C.L.B., E.J.B., K.B., C.B., R.J.D., A.S.G., H.L.G., E.K., E.D.M., L.K.N., S.O., P.O., M.C.O., R.F.R., R.H.S., N.J.S., K.A.T., E.U., N.K.W.), American Academy of Family Physicians (T.G.G.), American College of Obstetricians and Gynecologists (C.G.), American College of Cardiology Foundation (M.G.), Society of Thoracic Surgeons (C.K.H.), American Medical Women's Association (D.R.J.), Centers for Disease Control and Prevention (N.K.), Ad Hoc Writing Group Member (D.P.), Office of Research on Women's Health (V.W.P.), Association of Black Cardiologists (R.S.), American College of Physicians (K.S.),† World Heart Federation (S.C.S.), National Heart, Lung, and Blood Institute (G.S.), and American College of Nurse Practitioners (B.A.T.).

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Worldwide, cardiovascular disease (CVD) is the largest single cause of death among women, accounting for one third of all deaths.[1] In many countries, including the United States, more women than men die every year of CVD, a fact largely unknown by physicians.[2,3] The public health impact of CVD in women is not related solely to the mortality rate, given that advances in science and medicine allow many women to survive heart disease. For example, in the United States, 38.2 million women (34%) are living with CVD, and the population at risk is even larger.[2] In China, a country with a population of approximately 1.3 billion, the age-standardized prevalence rates of dyslipidemia and hypertension in women 35 to 74 years of age are 53% and 25%, respectively, which underscores the enormity of CVD as a global health issue and the need for prevention of risk factors in the first place.[4] As life expectancy continues to increase and economies become more industrialized, the burden of CVD on women and the global economy will continue to increase.[5]

The human toll and economic impact of CVD are difficult to overstate. In the United States alone, $403 billion was estimated to be spent in 2006 on health care or in lost

†Representation does not imply endorsement by the American College of Physicians.

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productivity as a result of CVD, compared with $190 billion for cancer and $29 billion for human immunodeficiency virus (HIV).[2] In addition to population-based and macroeconomic interventions, interventions in individual patients are key to reducing the incidence of CVD globally.[6] Prevention of CVD is paramount to the health of every woman and every nation. Even modest control could have an enormous impact. It is projected that a reduction in the death rate due to chronic diseases by just 2% over 1 decade would prevent 36 million deaths.[6]

Fortunately, most CVD in women is preventable. In 1999, the American Heart Association (AHA) published a scientific statement titled "A Guide to Preventive Cardiology in Women," which was based on a 1997 review of the literature that documented unique aspects of risk factor management and the occurrence of CVD in women.[7,8] Over the subsequent decade, many landmark clinical trials in the prevention of CVD altered the practice of medicine. In 2003, a systematic literature search was conducted to develop evidence-based guidelines for the prevention of CVD in women.[9] Demand for clinical trial evidence increased in the wake of the Women's Health Initiative's discordant findings with observational studies of hormone therapy.[10] Some commonly used preventive interventions lacked clinical trial data for women, and it was unclear whether results of studies conducted in men could be generalized to women. Since the 2003 literature review, numerous clinical trials that have a bearing on CVD prevention in women have been completed (see Appendix). These new research findings must be interpreted in the context of existing data and as-yet missing information so they can be translated appropriately into practice. With few exceptions (eg, the use of aspirin for primary prevention of heart disease), recommendations to prevent CVD in women do not differ from those for men. Healthcare providers should be aware that in some instances, the risk-reducing interventions recommended in these guidelines (eg, angiotensin-converting enzyme inhibitors and angiotensin receptor blockers for blood pressure control) are contraindicated in women contemplating pregnancy or in those who are pregnant.

This 2007 update provides the most current clinical recommendations for the prevention of CVD in women ≥20 years of age and is based on a systematic search of the highest-quality science, interpreted by experts in the fields of cardiology, epidemiology, family medicine, gynecology, internal medicine, neurology, nursing, public health, statistics, and surgery. These guidelines cover the primary and secondary prevention of chronic atherosclerotic vascular diseases. More acute management of vascular disease in the periprocedural or immediate posthospital settings and of valvular heart disease is covered in other AHA guidelines. Management of heart failure, atrial fibrillation for stroke prevention, and CVD risk factors during pregnancy is beyond the scope of the present document.

CVD Risk Assessment in Women

The 2004 guidelines emphasized the importance of recognizing the spectrum of CVD and thus classified women as being at high risk, intermediate risk, lower risk, and optimal risk. Classification was based on clinical criteria and/or the Framingham global risk score.[11] These criteria are still used to help guide lipid therapy. The 2007 update recommends a scheme for a general approach to the female patient that classifies her as at high risk, at risk, or at optimal risk (Table 1). The rationale for the change includes several factors: (1) The average lifetime risk for CVD in women is very high, approaching 1 in 2, so prevention is important in all women[12,13]; (2) most clinical trial data used to formulate the recommendations included either women at high risk because of known CVD or apparently healthy women with a spectrum of risk, which allowed the current scheme to align the guidelines with the evidence; and (3) there has been a growing appreciation of the limitations of risk stratification with the Framingham risk function in diverse populations of women, including the narrow focus on short-term (10-year) risk of myocardial infarction and coronary heart disease death, lack of inclusion of family history, overestimation or underestimation of risk in nonwhite populations, and the documentation of subclinical disease among many women who score as being at low risk.[14]

The panel believed that a Framingham global risk score >20% could be used to identify a woman at high risk but that a lower score is not sufficient to ensure that an individual woman is at low risk. Even the presence of a single risk factor at 50 years of age is associated with a substantially increased lifetime absolute risk for CVD and shorter duration of

TABLE 1. Classification of CVD Risk in Women

Risk Status	Criteria
High risk	Established coronary heart disease
	Cerebrovascular disease
	Peripheral arterial disease
	Abdominal aortic aneurysm
	End-stage or chronic renal disease
	Diabetes mellitus
	10-Year Framingham global risk >20%*
At risk	≥1 major risk factors for CVD, including:
	Cigarette smoking
	Poor diet
	Physical inactivity
	Obesity, especially central adiposity
	Family history of premature CVD (CVD at <55 years of age in male relative and <65 years of age in female relative)
	Hypertension
	Dyslipidemia
	Evidence of subclinical vascular disease (eg, coronary calcification)
	Metabolic syndrome
	Poor exercise capacity on treadmill test and/or abnormal heart rate recovery after stopping exercise
Optimal risk	Framingham global risk <10% and a healthy lifestyle, with no risk factors

CVD indicates cardiovascular disease.

*Or at high risk on the basis of another population-adapted tool used to assess global risk.

survival.[13] Women who are at risk of CVD because they have ≥1 risk factor for heart disease, evidence of subclinical disease with or without risk factors, poor exercise capacity, or unhealthy lifestyles may have a broad range of risk for CVD. For example, a woman found to have coronary calcification or increased carotid intimal thickness may be at low absolute risk of CHD on the basis of the Framingham score, but she may actually be at intermediate or high risk of a future CVD event. Healthcare providers should take several factors into consideration, including medical and lifestyle history, Framingham risk score, family history of CVD, and other genetic conditions (eg, familial hypercholesterolemia), as they make decisions about the aggressiveness of preventive therapy. The optimal risk category has been maintained in the present update and emphasizes the importance of optimizing modifiable risk, especially with regard to maintaining a healthy lifestyle, and may reassure some women or motivate others.

The role that novel CVD risk factors (eg, high-sensitivity C-reactive protein) and novel screening technologies (eg, coronary calcium scoring) should play in guiding preventive interventions is not yet defined. Further research is needed on added benefits, risks, and costs associated with such strategies before they can be incorporated into guidelines. Unique opportunities to identify women's risk (eg, during pregnancy) also deserve further exploration. For example, preeclampsia may be an early indicator of CVD risk.[15,16] Women with preeclampsia/eclampsia are significantly more likely to develop hypertension and cerebrovascular disease.[15,16] In addition, maternal placental syndromes in combination with traditional cardiovascular risk factors, such as prepregnancy hypertension or diabetes mellitus, obesity, dyslipidemia, or metabolic syndrome, may be additive in defining CVD risk in women.[16] Future research should evaluate the potential for events or medical contact during unique phases in a woman's lifespan, such as adolescence, pregnancy, and menopause, to identify women at high risk and to determine the effectiveness of preventive interventions during critical time periods.

Several important changes from the 2004 guidelines should be noted. First, the approach to risk stratification of women places greater emphasis on lifetime risk than on short-term absolute risk, defined by the Framingham global score, in part because of the limitations described above. The panel acknowledged that nearly all women are at risk for CVD, which underscores the importance of a heart-healthy lifestyle. Additionally, some women are at high risk of future events because of established CVD and/or multiple risk factors. These women are candidates for more aggressive preventive therapy. Second, more definitive data about menopausal therapy, aspirin therapy, and folic acid therapy have been published in recent years, and the guidelines have been revised accordingly. Of note is that aspirin therapy should be considered for all women for stroke prevention, depending on the balance of risks and benefits. Finally, an algorithm is provided to assist healthcare providers in evaluating CVD risk in women and prioritizing preventive interventions.

Methods

Selection of Expert Panel

The AHA Manuscript Oversight Committee commissioned the update of the guidelines and approved the chair of the expert panel, who was a nonvoting member of the panel. The leadership of each AHA scientific council and interdisciplinary working group was asked to nominate a recognized expert in CVD prevention who had particular knowledge about women. Major professional or government organizations with a mission consistent with CVD prevention were solicited to serve as cosponsors and were each asked to nominate 1 representative with full voting rights to serve on the expert panel. Each panel member completed a conflict-of-interest statement and was asked to abstain from discussion of or voting on any recommendations they deemed to be a potential conflict of interest. Panelists also suggested diverse professional and community organizations to endorse the final document after its approval by the AHA Science Advisory and Coordinating Committee and cosponsoring organizations.

Selection of Topics and Systematic Search

The expert panel reviewed the list of recommendations in the 2004 guidelines and suggested additional topics to be researched to determine whether they warranted discussion or a clinical recommendation. The methods for the systematic search were similar to those for the research conducted in 2003 and described previously.[9] The time period for the updated search was January 2003 through June 7, 2006. New topics were searched electronically on 3 databases from their inception (Medline, 1966 through June 7, 2006; CINAHL, 1982 through June 7, 2006; and PsychInfo, 1872 through June 7, 2006).

Briefly, studies were included if they were randomized clinical trials or large prospective cohort studies (>1000 subjects) of CVD risk–reducing interventions, meta-analyses that used a quantitative systematic review process, or surrogate end-point studies with at least 10 cases of major clinical CVD end points reported. The systematic search was conducted by the Duke Center for Clinical Health Policy Research, Durham, NC. Table 2 lists the number of articles included/excluded for each category of recommendation. A total of 5774 articles were initially identified; 828 were included for full-text screening, and 246 met the inclusion criteria and were included in the evidence tables. Some proposed new topics were searched but not included in the guidelines because the expert panel determined the data were insufficient to make clinical recommendations (eg, yoga/stress reduction) or because the topic had been covered in other recent guidelines (eg, treatment of atrial fibrillation for stroke prevention).[17,18] The summary evidence used by the expert panel can be obtained online as a Data Supplement at http://circ.ahajournals.org/cgi/content/full/CIRCULATIONAHA.107.181546/DC1.

Evidence Rating and Recommendation Procedures

A series of conference calls to discuss recommendations was conducted. Primary and secondary reviewers were assigned to each recommendation to modify any wording and to ensure that the evidence tables were complete for that topic. Each expert received a final copy of the evidence tables and voted independently on the strength of the recommendation (Class I, IIa, IIb, or III) and level of evidence (A, B, or C) as outlined in Table 3. The final rating of evidence was determined by a

TABLE 2. Summary of Articles Identified From Systematic Literature Review, by Topic (2006)

Topic	Abstracts Identified	Articles Included for Full-Text Screening	Meta-Analyses Identified	Articles Included for Evidence Tables
Hyperlipidemia	166	27	5	9
Physical activity	298*	53†	1	11
Smoking	281	71	0	1
Antiplatelet therapy	402	95‡	7	12
Hypertension	78	32	1	10
β-Blocker therapy	234	17	1	4
Cardiac rehabilitation	298*	53†	3	3
ACE/ARB therapy	251	44	7	13
Weight management	52	4	0	1
Diabetes mellitus	119	14	2	8
Hormone replacement therapy/SERMs§	154	24	1	10
Diet modification	144	123‡	1	28
Warfarin, antiplatelet therapy,§ and antiarrhythmic therapy§ in atrial fibrillation	460	73	23	27
Aspirin for primary prevention	7	95†	2	1
Psychosocial§/depression	409	42	0	10
Antioxidant supplementation	48	13	3	5
Omega-3 fatty acid supplementation	87	23	3	4
Folic acid supplementation, vitamin B6,§ vitamin B12§	192	36	0	8
New search terms				
Alcohol	325	123‡	0	57
CHF rehabilitation	388	31	4	3
PVD rehabilitation	94	22	0	0
Yoga/stress reduction	83	20	2	6
Aldosterone blocker	239	7	0	4
Stroke rehabilitation	1263	57	11	11
Total	5774	828	77	246

ACE indicates angiotensin-converting enzyme; ARB, angiotensin receptor blocker; SERMs, selective estrogen-receptor modulators; CHF, congestive heart failure; and PVD, peripheral vascular disease.

*Physical activity and cardiac rehabilitation were combined during the initial literature search and full-text screening phase. This number reflects the total number of abstracts identified and articles included at full text as physical activity or cardiac rehabilitation.

†Antiplatelet therapy for coronary artery disease and aspirin for primary prevention were combined during the full-text screening phase. This number reflects the total number of articles included at full text as antiplatelet therapy for coronary artery disease or aspirin for primary prevention.

‡Diet modification and alcohol were combined during the full-text screening phase. This number reflects the total number of articles included at full text as diet modification or alcohol.

§New search term for 2006 combined with previous 2003 topic.

majority vote. Modifications to text and clinical recommendations were made on the basis of peer review comments and cosponsor reviews. The guidelines were then finalized and approved by the expert panel.

Clinical Recommendations and Limitations

Evidence-based recommendations for the prevention of CVD in women are listed in Table 4. Each recommendation is accompanied by the strength of recommendation and the level of evidence to support it. The strength of the recommendation is based not only on the level of evidence to support a clinical recommendation but also on other factors, such as the feasibility of conducting randomized controlled trials in women. Recommendations are grouped in the following categories: lifestyle interventions, major risk factor interventions, and preventive drug interventions. Table 5 lists Class III interventions that are not recommended for the prevention of CVD, or myocardial infarction in particular, on the basis of current evidence.

The expert panel tried to simplify the guidelines as much as possible while attempting to preserve the integrity of the evidence-based process. This required the assumption of a class effect for most therapeutic interventions, and it should be noted that data are limited with regard to gender differences in any potential class effects. Although most agents in a single therapeutic class share similar efficacy in reducing CVD risk, the safety profiles and costs may vary significantly among agents; healthcare providers should take these factors into consideration as they prescribe pharmacotherapy to prevent CVD.

The panel also emphasizes that the effectiveness of therapies prescribed in the actual office or hospital setting may vary substantially from the efficacy and safety profiles observed in clinical trials because of wide variations in

TABLE 3. Classification and Levels of Evidence

	Strength of Recommendation
Classification	
Class I	Intervention is useful and effective.
Class IIa	Weight of evidence/opinion is in favor of usefulness/efficacy.
Class IIb	Usefulness/efficacy is less well established by evidence/opinion.
Class III	Intervention is not useful/effective and may be harmful.
Level of evidence	
A	Sufficient evidence from multiple randomized trials
B	Limited evidence from single randomized trial or other nonrandomized studies
C	Based on expert opinion, case studies, or standard of care

patient characteristics and adherence to therapy as prescribed. Guideline development has limitations related to the generalizability of results from one population to another. The net clinical impact of an intervention may not be reflected in the scope of CVD outcomes evaluated in these guidelines. Moreover, many studies used to formulate recommendations did not include older women, especially those >80 years of age, in whom CVD and comorbidities are common. Healthcare providers should use clinical judgment about the aggressiveness of preventive interventions in all women, especially older women.

Guideline Implementation

A suggested algorithm for the prevention of CVD in women that incorporates the updated guidelines is presented in the Figure. Although a comprehensive plan to maximize implementation of the guidelines in various practice settings is beyond the scope of this document, barriers to CVD prevention should be discussed with women. A previous study by the AHA has documented numerous barriers to heart health in women; chief among them was confusion by mixed messages from the media.[21] Other barriers that healthcare providers can address were as follows: 36% of women did not perceive themselves to be at risk, 25% said their healthcare provider did not say heart health was important, and 1 in 5 said healthcare providers did not clearly explain how they could change their risk status.[21] Physicians have cited lack of insurance coverage as a barrier to assisting their patients with lifestyle changes.[3]

Widespread documentation of lack of adherence to CVD prevention guidelines is available, even among women at high risk of CVD in managed-care settings in the United States in which access and medication coverage are available.[22] Policy makers, healthcare providers, and patients all have roles to play in maximizing adherence to preventive interventions and reducing the burden of CVD. It is also important to recognize that although the causes of CVD are common to all parts of the world, the approaches to its prevention at the societal or individual level will differ among countries for cultural, social, medical, and economic reasons.[23]

Research Needs and Future Directions

The expert panel suggested several gaps in knowledge related to the prevention of CVD that must be addressed to optimize the cardiovascular health of women. More rigorous testing of the impact of guidelines themselves on prevention of risk factors, slowing the progression of risk factors, and reducing the burden of CVD is needed. The development and testing of effective methods to implement guidelines in various healthcare settings, at work sites, and in communities are also research priorities. The role of communication of risk and barriers to CVD prevention should be studied and incorporated into creative methods to disseminate and implement guidelines among diverse populations of women.

The role of genetics in risk stratification and in the responsiveness to preventive interventions is an active and important area of research. Likewise, the role of gender and sex hormones requires further study to understand how they affect outcomes after interventions and how female sex may modify the prognostic value of new biomarkers and measures of subclinical CVD.

Population-wide strategies are necessary to combat the pandemic of CVD in women, because individually tailored interventions alone are likely insufficient to maximally prevent and control CVD. Public policy as an intervention to reduce gender-based disparities in CVD preventive care and improve cardiovascular outcomes among women must become an integral strategy to reduce the global burden of CVD.

TABLE 4. Guidelines for Prevention of CVD in Women: Clinical Recommendations

Lifestyle interventions

Cigarette smoking

Women should not smoke and should avoid environmental tobacco smoke. Provide counseling, nicotine replacement, and other pharmacotherapy as indicated in conjunction with a behavioral program or formal smoking cessation program *(Class I, Level B)*.

Physical activity

Women should accumulate a minimum of 30 minutes of moderate-intensity physical activity (eg, brisk walking) on most, and preferably all, days of the week *(Class I, Level B)*.

Women who need to lose weight or sustain weight loss should accumulate a minimum of 60 to 90 minutes of moderate-intensity physical activity (eg, brisk walking) on most, and preferably all, days of the week *(Class I, Level C)*.

Rehabilitation

A comprehensive risk-reduction regimen, such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program, should be recommended to women with a recent acute coronary syndrome or coronary intervention, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease *(Class I, Level A)*, or current/prior symptoms of heart failure and an LVEF $<40\%$ *(Class I, Level B)*.

Dietary intake

Women should consume a diet rich in fruits and vegetables; choose whole-grain, high-fiber foods; consume fish, especially oily fish,* at least twice a week; limit intake of saturated fat to $<10\%$ of energy, and if possible to $<7\%$, cholesterol to <300 mg/d, alcohol intake to no more than 1 drink per day,† and sodium intake to <2.3 g/d (approximately 1 tsp salt). Consumption of *trans*-fatty acids should be as low as possible (eg, $<1\%$ of energy) *(Class I, Level B)*.

Weight maintenance/reduction

Women should maintain or lose weight through an appropriate balance of physical activity, caloric intake, and formal behavioral programs when indicated to maintain/achieve a BMI between 18.5 and 24.9 kg/m^2 and a waist circumference $\leq$35 in *(Class I, Level B)*.

Omega-3 fatty acids

As an adjunct to diet, omega-3 fatty acids in capsule form (approximately 850 to 1000 mg of EPA and DHA) may be considered in women with CHD, and higher doses (2 to 4 g) may be used for treatment of women with high triglyceride levels *(Class IIb, Level B)*.

Depression

Consider screening women with CHD for depression and refer/treat when indicated *(Class IIa, Level B)*.

Major risk factor interventions

Blood pressure—optimal level and lifestyle

Encourage an optimal blood pressure of $<120/80$ mm Hg through lifestyle approaches such as weight control, increased physical activity, alcohol moderation, sodium restriction, and increased consumption of fresh fruits, vegetables, and low-fat dairy products *(Class I, Level B)*.

Blood pressure—pharmacotherapy

Pharmacotherapy is indicated when blood pressure is $\geq$140/90 mm Hg or at an even lower blood pressure in the setting of chronic kidney disease or diabetes ($\geq$130/80 mm Hg). Thiazide diuretics should be part of the drug regimen for most patients unless contraindicated or if there are compelling indications for other agents in specific vascular diseases. Initial treatment of high-risk women‡ should be with β-blockers and/or ACE inhibitors/ARBs, with addition of other drugs such as thiazides as needed to achieve goal blood pressure *(Class I, Level A)*.

Lipid and lipoprotein levels—optimal levels and lifestyle

The following levels of lipids and lipoproteins in women should be encouraged through lifestyle approaches: LDL-C <100 mg/dL, HDL-C >50 mg/dL, triglycerides <150 mg/dL, and non–HDL-C (total cholesterol minus HDL cholesterol) <130 mg/dL *(Class I, Level B)*. If a woman is at high risk‡ or has hypercholesterolemia, intake of saturated fat should be $<7\%$ and cholesterol intake <200 mg/d) *(Class I, Level B)*.

Lipids—pharmacotherapy for LDL lowering, high-risk women

Utilize LDL-C–lowering drug therapy simultaneously with lifestyle therapy in women with CHD to achieve an LDL-C <100 mg/dL *(Class I, Level A)* and similarly in women with other atherosclerotic CVD or diabetes mellitus or 10-year absolute risk $>20\%$ *(Class I, Level B)*.

A reduction to <70 mg/dL is reasonable in very-high-risk women§ with CHD and may require an LDL-lowering drug combination *(Class IIa, Level B)*.

Lipids—pharmacotherapy for LDL lowering, other at-risk women

Utilize LDL-C–lowering therapy if LDL-C level is $\geq$130 mg/dL with lifestyle therapy and there are multiple risk factors and 10-year absolute risk 10% to 20% *(Class I, Level B)*.

Utilize LDL-C–lowering therapy if LDL-C level is $\geq$160 mg/dL with lifestyle therapy and multiple risk factors even if 10-year absolute risk is $<10\%$ *(Class I, Level B)*.

Utilize LDL-C–lowering therapy if LDL $\geq$190 mg/dL regardless of the presence or absence of other risk factors or CVD on lifestyle therapy *(Class I, Level B)*.

Lipids—pharmacotherapy for low HDL or elevated non–HDL, high-risk women

Utilize niacin‖ or fibrate therapy when HDL-C is low or non–HDL-C is elevated in high-risk women‖ after LDL-C goal is reached *(Class IIa, Level B)*.

Lipids—pharmacotherapy for low HDL or elevated non-HDL, other at-risk women

Consider niacin‖ or fibrate therapy when HDL-C is low or non–HDL-C is elevated after LDL-C goal is reached in women with multiple risk factors and a 10-year absolute risk 10% to 20% *(Class IIb, Level B)*.

Diabetes mellitus

Lifestyle and pharmacotherapy should be used as indicated in women with diabetes *(Class I, Level B)* to achieve an HbA_{1C} $<7\%$ if this can be accomplished without significant hypoglycemia *(Class I, Level C)*.

TABLE 4. Continued

Preventive drug interventions
Aspirin, high risk
Aspirin therapy (75 to 325 mg/d)¶ should be used in high-risk‡ women unless contraindicated *(Class I, Level A).*
If a high-risk‡ woman is intolerant of aspirin therapy, clopidogrel should be substituted *(Class I, Level B).*
Aspirin—other at-risk or healthy women
In women ≥65 years of age, consider aspirin therapy (81 mg daily or 100 mg every other day) if blood pressure is controlled and benefit for ischemic stroke and MI prevention is likely to outweigh risk of gastrointestinal bleeding and hemorrhagic stroke *(Class IIa, Level B)* and in women <65 years of age when benefit for ischemic stroke prevention is likely to outweigh adverse effects of therapy *(Class IIb, Level B).*
β-Blockers
β-Blockers should be used indefinitely in all women after MI, acute coronary syndrome, or left ventricular dysfunction with or without heart failure symptoms, unless contraindicated *(Class I, Level A).*
ACE inhibitors/ARBs
ACE inhibitors should be used (unless contraindicated) in women after MI and in those with clinical evidence of heart failure or an LVEF ≤40% or with diabetes mellitus *(Class I, Level A).* In women after MI and in those with clinical evidence of heart failure or an LVEF ≤40% or with diabetes mellitus who are intolerant of ACE inhibitors, ARBs should be used instead *(Class I, Level B).*
Aldosterone blockade
Use aldosterone blockade after MI in women who do not have significant renal dysfunction or hyperkalemia who are already receiving therapeutic doses of an ACE inhibitor and β-blocker, and have LVEF ≤40% with symptomatic heart failure *(Class I, Level B).*

LVEF indicates left ventricular ejection fraction; BMI, body mass index; EPA, eicosapentaenoic acid; DHA, docosahexaenoic acid; CHD, coronary heart disease; ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blocker; LDL-C, low-density lipoprotein cholesterol; HDL-C, high-density lipoprotein cholesterol; CVD, cardiovascular disease; and MI, myocardial infarction.

*Pregnant and lactating women should avoid eating fish potentially high in methylmercury (eg, shark, swordfish, king mackerel, or tile fish) and should eat up to 12 oz/wk of a variety of fish and shellfish low in mercury and check the Environmental Protection Agency and the US Food and Drug Administration's Web sites for updates and local advisories about safety of local catch.

†A drink equivalent is equal to a 12-oz bottle of beer, a 5-oz glass of wine, or a 1.5-oz shot of 80-proof spirit.

‡Criteria for high risk include established CHD, cerebrovascular disease, peripheral arterial disease, abdominal aortic aneurysm, end-stage or chronic renal disease, diabetes mellitus, and 10-year Framingham risk >20%.

§Criteria for very high risk include established CVD plus any of the following: multiple major risk factors, severe and poorly controlled risk factors, diabetes mellitus.[19]

‖Dietary supplement niacin should not be used as a substitute for prescription niacin.

¶After percutaneous intervention with stent placement or coronary artery bypass grafting within previous year and in women with noncoronary forms of CVD, use current guidelines for aspirin and clopidogrel.[20]

TABLE 5. Class III Interventions (Not Useful/Effective and May Be Harmful) for CVD or MI Prevention in Women

Menopausal therapy
Hormone therapy and selective estrogen-receptor modulators (SERMs) should not be used for the primary or secondary prevention of CVD *(Class III, Level A).*
Antioxidant supplements
Antioxidant vitamin supplements (eg, vitamin E, C, and beta carotene) should not be used for the primary or secondary prevention of CVD *(Class III, Level A).*
Folic acid*
Folic acid, with or without B6 and B12 supplementation, should not be used for the primary or secondary prevention of CVD *(Class III, Level A).*
Aspirin for MI in women <65 years of age†
Routine use of aspirin in healthy women <65 years of age is not recommended to prevent MI *(Class III, Level B).*

CVD indicates cardiovascular disease; MI, myocardial infarction.

*Folic acid supplementation should be used in the childbearing years to prevent neural tube defects.

†For recommendation for aspirin to prevent CVD in women ≥65 years of age or stroke in women <65 years of age, please see Table 4.

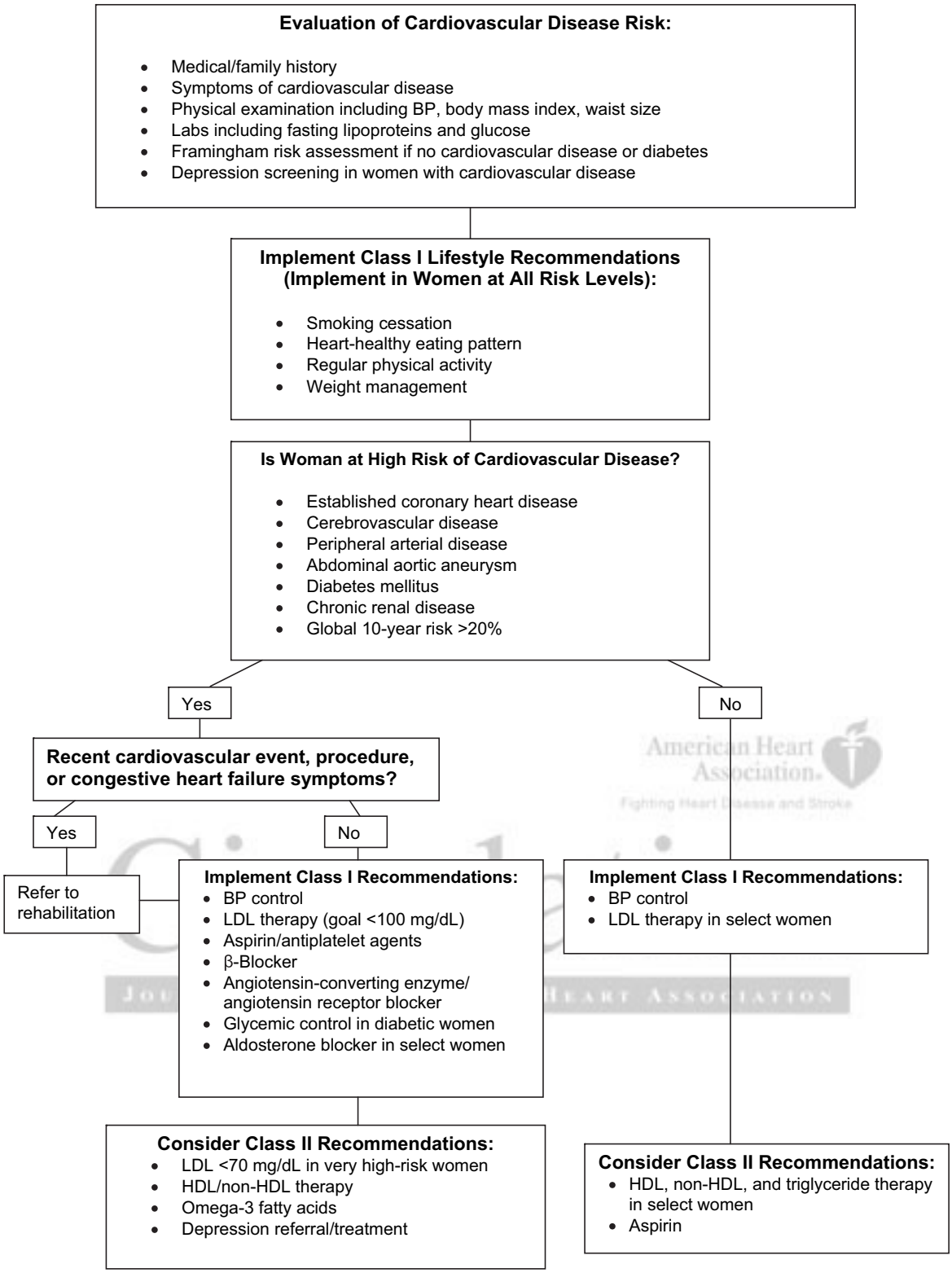

Figure. Algorithm for CVD preventive care in women. Labs indicates laboratory tests; BP, blood pressure; LDL, low-density lipoprotein cholesterol; and HDL, high-density lipoprotein cholesterol.

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Peripheral Vascular Disease Rehabilitation Meta-Analyses

None reported.

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Aldosterone Blocker Meta-Analyses

None reported.

Disclosures

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*Modest.

†Significant.

‡Representation does not imply endorsement by the American College of Physicians.

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