

**Cardiovascular Disease Prevention in Women: Update on the 2011  
American Heart Association (AHA) Guidelines**

**Objectives**

- Discuss strategies to assess and stratify women into high risk, at risk, and ideal health categories for cardiovascular disease (CVD)
- Summarize lifestyle approaches to the prevention of CVD in women
- Review American Heart Association (AHA) 2011 Guidelines approaches to CVD prevention for patients with hypertension, lipid abnormalities, and diabetes, with a focus on effectiveness in practice
- Review AHA 2011 Guidelines approach to pharmacological intervention for women at risk for cardiovascular events
- Summarize commonly used therapies that should not be initiated for the prevention or treatment of CVD, because they lack benefit or because risks outweigh benefits

Coronary heart disease is the leading cause of death for all women. The following table shows deaths per 100,000. African American women have higher death rates for CHD, stroke and lung cancer than white, Hispanic or Asian women.

	CHD	Stroke	Lung Cancer	Breast Cancer
Black/African American	130.0	57.0	39.0	32.2
White	101.5	41.0	41.3	23.0
Hispanic	84.5	32.3	14.1	14.8
Asian	58.9	34.9	18.1	11.7

**SOURCES:**

(1) Lloyd-Jones D, Adams RJ, Brown TM, Carnethon M, Dai S, De Simone G, Ferguson TB, Ford E, Furie K, Gillespie C, Go A, Greenlund K, Haase N, Hailpern S, Ho PM, Howard V, Kissela B, Kittner S, Lackland D, Lisabeth L, Marelli A, McDermott MM, Meigs J, Mozaffarian D, Mussolino M, Nichol G, Roger VL, Rosamond W, Sacco R, Sorlie P, Stafford R, Thom T, Wasserthiel-Smoller S, Wong ND, Wylie-Rosett J; American Heart Association Statistics Committee and Stroke Statistics Subcommittee. (2010). Executive summary: Heart disease and stroke statistics-2010 update. A report from the American Heart Association. *Circulation*, 121, 948-954.

(2) Centers for Disease Control and Prevention, National Center for Health Statistics, Health Data Interactive, 2005-2007. Available at: <http://www.cdc.gov/nchs/hdi.htm>.

The chart below shows the number of U.S. men and women diagnosed with myocardial infarction and fatal CHD by age. Although women in general present at later ages than men, over 10,000 reproductive age women per year are diagnosed with myocardial infarction or suffer fatal CHD.

	Age 35-44	Age 45-64	Age 65-74	Age 75+
Men	30,000	265,000	180,000	235,000
Women	10,000	95,000	95,000	290,000

**SOURCE:**

(1) Rosamond W, Flegal K, Furie K, Go A, Greenlund K, Haase N, Hailpern SM, Ho M, Howard V, Kissela B, Kittner S, Lloyd-Jones D, McDermott M, Meigs J, Moy C, Nichol G, O'Donnell C, Roger V, Sorlie P, Steinberger J, Thom T, Wilson M, Hong Y, for the American Heart Association Statistics Committee and

Stroke Statistics Subcommittee (2008). AHA Statistical Update, Heart Disease and Stroke Statistics—2008 Update, A Report From the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*, 117, e25-e146.

The chart below shows the number of U.S. cardiovascular disease deaths from 1980-2007. While the number of CVD-related deaths in males has been steadily declining over the past 15-20 years, cardiovascular deaths for women remained flat or increased slightly during the 1980s and 1990s. The number of deaths for women has exceeded those for men over the past 20 years.

	1985	1990	1995	2000	2007
Men	487,000	445,000	452,000	440,000	391,886
Women	495,000	475,000	503,000	506,000	421,918

**SOURCES:**

(1) Rosamond W, Flegal K, Furie K, Go A, Greenlund K, Haase N, Hailpern SM, Ho M, Howard V, Kissela B, Kittner S, Lloyd-Jones D, McDermott M, Meigs J, Moy C, Nichol G, O’Donnell C, Roger V, Sorlie P, Steinberger J, Thom T, Wilson M, Hong Y, for the American Heart Association Statistics Committee and Stroke Statistics Subcommittee (2008). AHA Statistical Update, Heart Disease and Stroke Statistics—2008 Update, A Report From the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*. 117, e25-e146.

(2) Roger VL, Go AS, Lloyd-Jones DM, et al. (2011). Heart disease and stroke statistics--2011 update: A report from the American Heart Association. *Circulation*, 123(4), e18-209.

**Cultural Competency: Considering the Diversity of Patients**

- In addition to race/geographic/ethnic origin, other facets of diversity should be considered, including:
  - Age, language, culture, literacy, disability, frailty, socioeconomic status, occupational status, and religious affiliation
- The root causes of disparities include variations and lack of understanding of health beliefs, cultural values and preferences, and patients’ inability to communicate symptoms in a language other than their own
- Clinicians also should be familiar with patients’ socioeconomic status, which may make attaining a healthy lifestyle and using medications more difficult

**SOURCE:**

(1) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D’Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

**Women Receive Fewer Interventions to Prevent and Treat Heart Disease**

- Less cholesterol screening
- Fewer lipid-lowering therapies
- Less use of heparin, beta-blockers and aspirin during myocardial infarction
- Less antiplatelet therapy for secondary prevention

- Fewer referrals to cardiac rehabilitation
- Fewer implantable cardioverter-defibrillators compared to men with the same recognized indications

SOURCES:

(1) Chandra NC, et al. (1998). Observations of the treatment of women in the United States with myocardial infarction: A report from the National Registry of Myocardial Infarction-I. *Archives of Internal Medicine*, 158, 981-988.

(2) Nohria A, et al. (1998). Gender differences in coronary artery disease in women: Gender differences in mortality after myocardial infarction: Why women fare worse than men. *Cardiology Clinics*, 16, 45-57.

Scott LB, Allen JK. (2004). Providers perceptions of factors affecting women's referral to outpatient cardiac rehabilitation programs: an exploratory study. *Journal of Cardiopulmonary Rehabilitation*, 24, 387-391.

(3) O'Meara JG, et al. (2004). Ethnic and sex differences in the prevalence, treatment, and control of dyslipidemia among hypertensive adults in the GENOA study. *Archives of Internal Medicine*, 164, 1313-1318.

(4) Hendrix KH, et al. (2005). Ethnic, gender, and age-related differences in treatment and control of dyslipidemia in hypertensive patients. *Ethnicity & Disease*, 15, 1-16.

(5) Hernandez AF, et al. (2007). Sex and racial differences in the use of implantable cardioverter-defibrillators among patients hospitalized with heart failure. *Journal of the American Medical Association*, 298, 1535-1532.

(6) Hernandez AF, et al. (2007). Sex and racial differences in the use of implantable cardioverter-defibrillators among patients hospitalized with heart failure. *Journal of the American Medical Association*, 298, 1535-1532.

(7) Cho L, et al. (2008). Gender differences in utilization of effective cardiovascular secondary prevention: a Cleveland Clinic Prevention Database study. *Journal of Womens Health*, 17, 1-7.

**Educate Patients About the Warning Symptoms of a Heart Attack**

- Chest pain, discomfort, pressure or squeezing are the most common symptoms for men and women
- Women are somewhat more likely than men to experience other heart attack symptoms, including:
  - Unusual upper body pain or discomfort in one or both arms, the back, shoulder, neck, jaw, or upper part of the stomach
  - Shortness of breath
  - Nausea/Vomiting
  - Unusual or unexplained fatigue (which may be present for days)
  - Breaking out in a cold sweat
  - Light-headedness or sudden dizziness
- If any of these symptoms occur, call 9–1–1 for emergency medical care.

SOURCES:

(1) Mosca L, Mochari-Greenberger H, Dolor RJ, Newby LK, Robb K. (2010). Twelve-Year follow-up of American Women's Awareness of Cardiovascular Disease (CVD) Risk and Barriers to Heart Health. *Circulation: Cardiovascular & Quality Outcomes*, 3,120-127.

(2) Act in Time Heart Attack Awareness Messages – DHHS Office on Women's Health, 2011.

**Encourage Patients To Make The Call. Don't Miss a Beat**

- Only 53% of women said they would call 9-1-1 if experiencing the symptoms of a heart attack
- However, 79% said they would call 9-1-1 if someone else was having a heart attack
- For themselves, 46% of women would do something other than call 9-1-1—such as take an aspirin, go to the hospital, or call the doctor

**SOURCES:**

(1) Mosca L, Mochari-Greenberger H, Dolor RJ, Newby LK, Robb K. (2010). Twelve-Year follow-up of American Women's Awareness of Cardiovascular Disease (CVD) Risk and Barriers to Heart Health. *Circulation: Cardiovascular & Quality Outcomes*, 3,120-127.

(2) Act in Time Heart Attack Awareness Messages – DHHS Office on Women's Health, 2011.

**2011 Update: Guidelines for the Prevention of Cardiovascular Disease in Women**

Mosca L, Benjamin EJ, Berra K, et al. Effectiveness-based guidelines for the prevention of cardiovascular disease in women-2011 update: A guideline from the American Heart Association. *Circulation*. 2011. [www.circulation.org](http://www.circulation.org).

**SOURCES:**

(1) Mosca L, et al. (2004). Evidence-based guidelines for cardiovascular disease prevention in women. *Circulation*, 109, 672-693.

(2) Mosca L, et al. (2007). Evidence-based guidelines for cardiovascular disease prevention in women: 2007 update. *Circulation*, 115, 1481-501.

(3) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

Evidence-based guidelines for the prevention of cardiovascular disease in women developed in 2004, updated in 2007, and updated again in 2011. For the original 2004 guidelines, over 1,270 articles were screened by the panel, and 400 articles were included for evidence tables. The summary evidence used by the expert panel in 2011 can be obtained online as a Data Supplement at <http://circ.ahajournals.org>.

**Calculate 10-Year Cardiovascular Disease (CVD) Risk using either lipids or BMI at [www.framinghamheartstudy.org/risk/gencardio.html#](http://www.framinghamheartstudy.org/risk/gencardio.html#)**

**Stratify Patients with the following conditions as High Risk:**

- Documented atherosclerotic disease, including
  - clinically manifest coronary heart disease
  - clinically manifest peripheral arterial disease

- clinically manifest cerebrovascular disease
- abdominal aortic aneurysm
- Diabetes mellitus
- End-stage or chronic kidney disease
- 10-year Framingham cardiovascular disease risk  $\geq$  10% [new in 2011]

**SOURCES:**

(1) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

(2) National Heart Lung and Blood Institute, "What Are the Signs and Symptoms of Coronary Artery Disease?" Retrieved from [http://www.nhlbi.nih.gov/health/dci/Diseases/Cad/CAD\\_SignsAndSymptoms.html](http://www.nhlbi.nih.gov/health/dci/Diseases/Cad/CAD_SignsAndSymptoms.html).

The major change in the 2011 guidelines for the definition of "high risk patients" is to identify "high risk patients" as those at 10% or higher risk of a CVD event within 10 years. The previous definition specified a 20% or higher risk.

**Stratify Patients as At Risk if they have  $\geq$  1 of the following risk factors for CVD, including (but not limited to):**

- Cigarette smoking
- Hypertension: SBP  $\geq$  120 mm Hg, DBP  $\geq$  80 mm Hg or treated
- Dyslipidemia
- Family history of premature CVD in a 1<sup>st</sup> degree relative (CVD at < 55 years in a male relative, or < 65 years in a female relative)
- Obesity, especially central obesity
- Physical inactivity
- Poor diet
- Metabolic syndrome
- Advanced subclinical atherosclerosis
- Poor exercise capacity on treadmill test and/or abnormal heart rate recovery after stopping exercise
- Systemic autoimmune collagen-vascular disease (e.g. lupus, rheumatoid arthritis) [new in 2011]
- A history of pregnancy-induced hypertension, gestational diabetes, preeclampsia [new in 2011]

**SOURCE:**

Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

The 2011 guidelines added systemic autoimmune collagen-vascular disease (e.g. lupus, rheumatoid arthritis) and a history of pregnancy-induced hypertension, gestational diabetes, and preeclampsia to the risk classification.

**Definition of Metabolic Syndrome in Women:**

- Abdominal obesity - waist circumference  $\geq$  35 in.,
- High triglycerides  $\geq$  150 mg/dL,
- Low HDL cholesterol  $<$  50 mg/dL,
- Elevated BP  $\geq$  130/85 mm Hg,
- Fasting glucose  $\geq$  100 mg/dL,

**SOURCE:**

(1) Grundy SM, et al. (2005). Diagnosis and management of the metabolic syndrome: An American Heart Association/National Heart, Lung, and Blood Institute scientific statement. *Circulation*, 112, 2735-2752.

The metabolic syndrome is characterized by a constellation of risk factors in one individual. This syndrome increases the risk for CHD at any given LDL-cholesterol level.

This is the American Heart Association/National Heart, Lung, and Blood Institute definition of metabolic syndrome. Patients are diagnosed with metabolic syndrome when three of five criteria are met. Patients receiving drug treatment for elevated triglycerides, reduced HDL, hypertension, or high glucose meet the threshold for each criteria. A cutoff of 31 inches waist circumference for Asian American women should be used.

**Common Diagnoses in Obstetrics and Gynecology that increase lifetime CVD risk**, include pregnancy-induced hypertension, gestational diabetes, polycystic ovary syndrome

Relative risk of subsequent cardiovascular disease:

- Gestational diabetes: 1.71
- Preeclampsia: 1.74
- Polycystic Ovary Syndrome (PCOS): 1.70

**SOURCES:**

(1) Shah BR et al. (2008). Increased risk of cardiovascular disease in young women following gestational diabetes mellitus. *Diabetes Care*, 31(8), 1668-1669.

(2) Wild R, et al. (2010). Assessment of cardiovascular risk and prevention of cardiovascular disease in women with the polycystic ovary syndrome: A consensus statement by the Androgen Excess and Polycystic Ovary Syndrome (AE-PCOS) Society. *Journal of Clinical Endocrinology & Metabolism*, 95(5).

(3) Hannaford P, et al. (1997). Cardiovascular sequelae of toxemia of pregnancy. *Heart*, 77, 154-158.

**Stratify patients as having Ideal Cardiovascular Health if they meet the following conditions:**

- Total cholesterol  $<$  200 mg/dL
- BP  $<$ 120/ $<$ 80 mm Hg untreated
- Fasting blood sugar  $<$  100 mg/dL untreated,
- Body mass index  $<$  25 kg/m<sup>2</sup>
- Abstinence from smoking (never or quit  $>$  12 months)
- Physical activity at goal

- DASH-like (“Dietary Approaches to Stop Hypertension”) diet

Ideal patients are rare in most clinical practices, making up less than 5% of women in most studies

#### SOURCES:

(1) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*. 123, 1243-1262.

(2) Stampfer MJ, Hu FB, Manson JE, Rimm EB, Willett WC. (2000). Primary prevention of coronary heart disease in women through diet and lifestyle. *New England Journal of Medicine*, 343(1), 16-22.  
Lloyd-Jones DM, Leip EP, Larson MG, et al. (2006). Prediction of lifetime risk for cardiovascular disease by risk factor burden at 50 years of age. *Circulation*, 113(6), 791-798.

(3) Akesson A, et al. (2007). Combined effect of low-risk dietary and lifestyle behaviors in primary prevention of myocardial infarction in women. *Archives of Internal Medicine*, 167, 2122-2127.

Using Framingham data, only 4.5% of women in a study published in 2006 were at optimal risk (3).

In a study of 24,444 postmenopausal women in Sweden after 6.2 yr follow-up, only 5% of women had all 5 measures of healthy behavior (healthy diet, moderate alcohol, physical activity, maintaining a normal weight, and not smoking), but this was associated with a 77% lower risk of MI (4).

#### **Other Lifestyle Interventions**

- Smoking cessation
- Physical activity
- Weight reduction/maintenance
- Heart healthy diet

#### SOURCE:

(1) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*. 123, 1243-1262.

These are the Class I lifestyle recommendations applicable to all women.

#### **Relative Risk of Coronary Events for Smokers Compared to Non-Smokers**

- In a cohort study of 84,129 U.S. female registered nurses (Nurses' Health Study), over 40% of coronary events were found to be attributable to smoking.
- Compared to nonsmokers, the relative risk of coronary events for those who smoke 1-14 cigarettes a day is 3.14 and 5.48 for those who smoke 15 cigarettes a day.

#### SOURCES:

(1) Stampfer MJ, Hu FB, Manson JE, Rimm EB, Willett WC. (2000). Primary prevention of coronary heart disease in women through diet and lifestyle. *New England Journal of Medicine*, 343(1), 16-22.

(2) Prescott E, et al. (1998). Smoking and risk of myocardial infarction in women and men: longitudinal population study. *BMJ*, 316, 1043-47.

In a cohort study of 84,129 U.S. female registered nurses (Nurses' Health Study), over 40% of coronary events were found to be attributable to smoking. The relative risk of coronary events for nonsmokers compared to smokers is demonstrated on this slide (1).

A prospective cohort study in Denmark showed a greater relative risk of myocardial infarction for current female smokers (RR=2.24) compared to current male smokers (RR=1.43) (2).

### Smoking Cessation

- All women should be consistently encouraged to stop smoking and avoid environmental tobacco
  - Women face barriers to quitting
    - Concomitant depression
    - Concerns about weight gain
  - Encourage women who stop smoking while pregnant and to continue abstinence postpartum
- Provide counseling, nicotine replacement, and other pharmacotherapy as indicated in conjunction with a behavioral program or other formal smoking cessation program
- 1-800-QUIT-NOW- free phone counseling and/or written materials

#### SOURCES:

(1) Fiore MC, et al. (2000). Treating tobacco use and dependence. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service. June 2000.

Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*. 123, 1243-1262.

(2) American College of Obstetricians and Gynecologists (ACOG). Smoking Cessation during Pregnancy. ACOG Committee Opinion, number 316, October 2005.

### Five A's

- Ask about tobacco use at every visit
- Advise in a clear and personalized message
- Assess willingness to quit
- Assist to quit
- Arrange follow-up

For more information: [www.surgeongeneral.gov/tobacco/#clinician](http://www.surgeongeneral.gov/tobacco/#clinician)

#### SOURCE :

(1) Fiore MC, et al. (2000). Treating tobacco use and dependence. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service. June 2000.



The 5 A's are designed to be a brief intervention for engaging patients in conversation about smoking cessation.

ASK about tobacco use at every opportunity; include in vital signs; stickers on charts or other reminders for physicians, other healthcare providers, and staff

ADVISE In a clear, strong message, advise them to quit. Personalize the message if possible

ASSESS willingness to quit; this is an important tool to see where they are in the process of change.

How does the patient view it?

ASSIST to quit; discuss how others have done it and how you can help them too

ARRANGE follow up; schedule follow up visits, phone calls (1)

### **Smoking Cessation: FDA-approved pharmacotherapy**

- Nicotine replacement therapy
  - Patch
  - Gum
  - Lozenge
  - Inhaler
- Bupropion
- Varenicline

ACOG recommends consideration of risks vs. benefits when considering the use of nicotine replacement or bupropion for smoking cessation in pregnant women, however, no pharmacological therapies are FDA approved for use during pregnancy.

SOURCES:

(1) Bader P, et al. (2009). An algorithm for tailoring pharmacotherapy for smoking cessation: results from a Delphi panel of international experts. *Tobacco Control*, 18, 34-42.

(2) American College of Obstetricians and Gynecologists (ACOG). Smoking Cessation during Pregnancy. ACOG Committee Opinion, number 316, October 2005.

### **Risk Reduction for CHD Associated with Exercise in Women**

- Research has shown that, after controlling for other factors that affect heart disease risk, women who walk the equivalent of three or more hours per week have a risk of coronary events that is 35% lower than women who walk infrequently.

SOURCE:

(1) Manson JE, et al. (1999). A prospective study of walking as compared with vigorous exercise in the prevention of coronary heart disease in women. *New England Journal of Medicine*, 341, 650-658.

Research has shown that, after controlling for other factors that affect heart disease risk, women who walk the equivalent of three or more hours per week have a risk of coronary events that is 35% lower than women who walk infrequently (1).

### **Modifiable Risk Factors: Sedentary Lifestyle**

- 40% of women report no leisure time physical activity
- 2004 data indicated that 28.9% of women reported engaging in leisure time physical activity as compared to 33.1% of men.
- 33.9% of African American women were reported as engaging in no leisure time physical activity as compared to 39.6% of Hispanic women and 21.6% of non-Hispanic white women.

SOURCES:

(1) U.S. Department of Health and Human Services. (1999). Physical activity and health: a Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

(2) Rosamond W, Flegal K, Furie K, Go A, Greenlund K, Haase N, Hailpern SM, Ho M, Howard V, Kissela B, Kittner S, Lloyd-Jones D, McDermott M, Meigs J, Moy C, Nichol G, O'Donnell C, Roger V, Sorlie P, Steinberger J, Thom T, Wilson M, Hong Y, for the American Heart Association Statistics Committee and Stroke Statistics Subcommittee (2008). AHA Statistical Update, Heart Disease and Stroke Statistics—2008 Update, A Report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*, 117, e25-e146.

### Physical Activity

- Consistently encourage the following:
  - Moderate Exercise – 150 minutes per week, OR
  - Vigorous Exercise – 75 minutes per week, OR
  - An equivalent combination of the two
- Aerobic exercise should be performed in episodes of at least 10 minutes, preferably spread throughout the week
- Muscle strengthening activities that involve all major muscle groups should be performed 2 or more days/week
- Moderate Exercise includes:
  - Dancing fast for 30 minutes
  - Raking leaves for 30 minutes
  - Gardening for 30-45 minutes
  - Pushing a stroller 1 mile in 30 minutes
- Women who need to lose weight or sustain weight loss should accumulate a minimum of 60-90 minutes of moderate-intensity physical activity on most, and preferably all, days of the week

### SOURCES:

(1) Mosca L, et al. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*. 123, 1243-1262.

(2) Surgeon General's Call-to-Action 2007: "Overweight and Obesity: What You Can Do." Available at: [http://www.surgeongeneral.gov/topics/obesity/calltoaction/fact\\_whatcanyoudo.htm](http://www.surgeongeneral.gov/topics/obesity/calltoaction/fact_whatcanyoudo.htm).

Examples of moderate amounts of physical activity

#### Common Chores

Washing and waxing a car for 45-60 minutes  
Washing windows or floors for 45-60 minutes  
Gardening for 30-45 minutes  
Wheeling self in wheelchair 30-40 minutes  
Pushing a stroller 1-1/2 miles in 30 minutes  
Raking leaves for 30 minutes  
Walking 2 miles in 30 minutes (15 min/mile)  
Shoveling snow for 15 minutes  
Stairwalking for 15 minutes

#### Sporting Activities

Playing volleyball for 45-60 minutes  
Playing touch football for 45 minutes  
Walking 1-3/4 miles in 35 minutes (20 min/mile)

Basketball (shooting baskets) 30 minutes  
Bicycling 5 miles in 30 minutes  
Dancing fast (social) for 30 minutes  
Water aerobics for 30 minutes  
Swimming laps for 20 minutes  
Basketball (playing game) for 15-20 minutes  
Bicycling 4 miles in 15 minutes  
Jumping rope for 15 minutes  
Running 1-1/2 miles in 15 min. (10 min/mile)

### **Body Weight and CHD Mortality Among Women**

- The participants in this part of the Nurses Health Study were 115,195 women free of diagnosed cardiovascular disease and cancer in 1976 who were followed until 1992.
- The lowest mortality was seen in women who weighed at least 15% less than the U.S. average, and among those whose weight had been stable since early adulthood
- Weight gain of 20 kg or more since the age of 18 confers a greater than 7 times relative risk of CHD mortality

#### **SOURCE:**

(1) Manson JE, et al. (1995). Body weight and mortality among women. *New England Journal of Medicine*, 333, 677-685.

### **Obesity Trends: 1990-2009**

- About one-third of U.S. adults (33.8%) are obese. Approximately 17% (or 12.5 million) of children and adolescents aged 2—19 years are obese. [Data from the National Health and Examination Survey (NHANES)]
- During the past 20 years, there has been a dramatic increase in obesity in the United States and rates remain high. In 2010, no state had a prevalence of obesity less than 20%. Thirty-six states had a prevalence of 25% or more; 12 of these states (Alabama, Arkansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Oklahoma, South Carolina, Tennessee, Texas, and West Virginia) had a prevalence of 30% or more.

#### **SOURCE:**

(1) U.S. Obesity Trends, National Obesity Trends. Centers for Disease Control and Prevention. Available at: <http://www.cdc.gov/obesity/data/trends.html>.

### **Weight Maintenance/Reduction Goals**

- Women should maintain or lose weight through an appropriate balance of physical activity, calorie intake, and formal behavioral programs when indicated to maintain:
  - BMI between 18.5 and 24.9 kg/m<sup>2</sup>
  - Waist circumference ≤ 35 inches
- Women can obtain a dietary plan customized to their BMI and level of physical activity at: [www.mypyramid.gov](http://www.mypyramid.gov)

#### **SOURCE:**

(1) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V,

Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*. 123, 1243-1262.

### **Body Mass Index: Definition**

- BMI = weight in kilograms divided by the square of the height in meters (kg/m<sup>2</sup>)
- BMI chart showing BMI based on weight in pounds and height in inches available at <http://www.nhlbi.nih.gov/guidelines/obesity/>
- Downloadable BMI calculator phone applications are available from the NHLBI website above.

#### **SOURCE:**

(1) National Heart, Lung, and Blood Institute, "Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults." Available at: <http://www.nhlbi.nih.gov/guidelines/obesity/>.

### **Low Risk Diet is Associated with Lower Risk of Myocardial Infarction in Women**

- In a population-based prospective cohort study of 24,444 postmenopausal women in Sweden, after 6.2 years of follow-up, a low risk diet characterized by a high intake of vegetables, fruit, whole grains, fish, and legumes, as well as moderate alcohol consumption, physical activity, maintaining a healthy weight, and not smoking were associated with lower risk of myocardial infarction. A combination of all healthy behaviors was predicted to prevent 77% of myocardial infarctions in the study population. In this study, only 5% of women had all healthy behaviors.
- AHA recommends women consume one or fewer alcoholic beverages a day.

#### **SOURCE:**

(1) Akesson A, et al. (2007). Combined effect of low-risk dietary and lifestyle behaviors in primary prevention of myocardial infarction in women. *Archives of Internal Medicine*, 167, 2122-2127.

### **Consistently Encourage Healthy Eating Patterns**

- Healthy food selections:
  - Fruits and vegetables (1 serving = 1 cup raw leafy vegetable, 1/2 cup cut-up raw or 1 medium fruit)
  - Whole grains, high fiber (1 serving = 1 slice bread, 1 oz. dry cereal, or 1/2 cup cooked rice, pasta, or cereal (all whole-grain))
  - Fish, especially oily fish, at least twice per week (1 serving = 3.5 oz. cooked)
  - No more than one drink of alcohol per day
  - Less than 1500 mg of sodium per day
- Saturated fats < 7% of calories, <150 mg cholesterol
- Limit sugar and trans fatty acid intake (main dietary sources are baked goods and fried foods made with partially hydrogenated vegetable oil)
- Pregnant women should be counseled to avoid eating fish with the potential for the highest level of mercury contamination (e.g., shark, swordfish, king mackerel or tilefish)

#### **SOURCES:**

(1) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*. 123, 1243-1262.

(2) National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). (2002).. 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) final report. *Circulation*, 106, 3143–3421.

Trans-fatty acids are found in hydrogenated vegetable oils and some animal fats (1).

Major sources are baked foods like crackers, cookies, doughnuts, breads, and food fried in hydrogenated vegetable oil, like French fries and fried chicken (1).

Based on data from randomized trials, trans-fatty acids raise LDL cholesterol (1).

### Major Risk Factor Interventions

- Blood Pressure
  - Target BP < 120/80 mm Hg
  - Pharmacotherapy if BP  $\geq$  140/90 mm Hg, or  $\geq$  130/80 mm Hg in diabetics or patients with renal disease
    - ACE inhibitors are contraindicated in pregnancy and ought to be used with caution in women who may become pregnant
- Lipids
  - Follow Third Report of the National Cholesterol Education Program (NCEP) Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP) III guidelines
- Diabetes
  - Target HbA1C <7%, if this can be accomplished without significant hypoglycemia

### SOURCE:

(1) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

### Hypertension:

- The average of two seated blood pressure measurements should guide care
  - If BP > 180/110 mm Hg, evaluate and treat immediately or within one week depending on the clinical situation
  - If BP > 160/100 mm Hg, evaluate and treat or refer within one month
  - If BP  $\geq$  140/90 mm Hg, recheck within 2 months, if confirmed, evaluate and treat or refer
  - If BP  $\geq$  120/80 mm Hg, counsel regarding lifestyle factors, recheck within one year and monitor
- Initial evaluation of the hypertensive patient should include 12-lead EKG, urinalysis, hematocrit, serum glucose, creatinine, calcium, and potassium measurement and a lipid profile.
- Encourage an optimal blood pressure of < 120/80 mm Hg through lifestyle approaches
- Pharmacologic therapy is indicated when blood pressure is  $\geq$  140/90 mm Hg or an even lower blood pressure in the setting of diabetes or target-organ damage ( $\geq$  130/80 mm Hg)

- Thiazide diuretics should be part of the drug regimen for most patients unless contraindicated, or unless compelling indications exist for other agents
- For high risk women, initial treatment should be with a beta-blocker or angiotensin converting enzyme inhibitor or angiotensin receptor blocker

#### SOURCES:

(1) The Seventh Report of the Joint National Committee on Prevention, Evaluation, and Treatment of High Blood Pressure. U.S. Department of Health and Human Services. National Institutes of Health. National Heart, Lung, and Blood Institute, NIH Publication No. 04-5230, 2004.

(2) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

#### **Lifestyle Approaches to Reduce Hypertension in Women**

- Maintain ideal body weight
  - Weight loss of as little as 10 lbs. reduces blood pressure
- Dietary Approaches to Stop Hypertension (DASH) eating plan (low sodium)
  - Even without weight loss, a low fat diet that is rich in fruits, vegetables, and low fat dairy products can reduce blood pressure
- Sodium restriction to 1500 mg per day may be beneficial, especially in African American patients
- Increase physical activity
- Limit alcohol to one drink per day
  - Alcohol raises blood pressure
  - One drink = 12 oz. beer, 5 oz. wine, or 1.5 oz. liquor

#### SOURCES:

(1) The Seventh Report of the Joint National Committee on Prevention, Evaluation, and Treatment of High Blood Pressure. U.S. Department of Health and Human Services. National Institutes of Health. National Heart, Lung, and Blood Institute, NIH Publication No. 04-5230, 2004.

(2) Sacks FM, et al. (2001). Effects on blood pressure of reduced dietary sodium and the dietary approaches to stop hypertension (DASH) diet. *New England Journal of Medicine*, 344, 3-10.

(3) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

#### **Dietary Approaches to Stop Hypertension (DASH) Eating Plan**

- 7–8 servings of grains, grain products daily
- 4–5 servings of vegetables daily
- 4–5 servings of fruits daily
- 2–3 servings of low-fat or nonfat dairy foods daily

- ≤2 servings of meats, poultry, fish daily
- 4–5 servings of nuts, seeds, legumes weekly
- Limited intake of fats, sweets

www.dashdiet.org

**SOURCE:**

(1) Facts about the DASH eating plan. Bethesda, MD: National Heart, Lung, and Blood Institute 1998. NIH publication no. 03-4082.

(2) Sacks FM, et al. (2001). Effects on blood pressure of reduced dietary sodium and the dietary approaches to stop hypertension (DASH) diet. *New England Journal of Medicine*, 344, 3-10.

In a multicenter randomized trial of 412 participants, the DASH (“Dietary Approaches to Stop Hypertension”) diet resulted in significantly lower systolic and diastolic blood pressure at high and intermediate levels of sodium intake (approximately 3500 mg and 2500 mg per day). A combination of the DASH diet and a sodium intake of approximately 1500 mg daily lowered mean systolic blood pressure by 11.5 mm Hg compared to a control diet with a sodium intake comparable to the average intake in the U.S. (3500 mg) (1).

The DASH diet is most effective when combined with low sodium intake (approximately 1500 mg per day).

**Lipids: Targets**

- Optimal levels of lipids and lipoproteins in women are as follows (these should be encouraged in all women with lifestyle approaches):
  - LDL-C < 100 mg/dL
  - HDL-C > 50 mg/dL
  - Triglycerides < 150 mg/dL
  - Non-HDL-C < 130 mg/dL (Non-HDL-C equals total cholesterol minus HDL-C)

**SOURCES:**

(1) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D’Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

**Dietary interventions have the potential to significantly lower LDL-C cholesterol – cumulatively between 20-30%**

Dietary Component	Dietary Change	Approximate LDL-C Reduction
<b>Major</b>		
Saturated fat	< 7% of calories	8-10%
Dietary cholesterol*	< 200 mg/day *New guidelines recommend < 150mg/day	3-5%
Weight reduction	Lose 10 lbs.	5-8%

<b>Other LDL-C-lowering options</b>		
Viscous fiber	5-10 g/day	3-5%
Plant sterol/stanol esters	2 g/day	6-15%

**SOURCE:**

National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). (2002). 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) final report. *Circulation*, 106, 3143–3421.

Dietary interventions have the potential to significantly lower LDL cholesterol (1).

**Lipids**

- LDL-C-lowering drug therapy is recommended simultaneously with lifestyle therapy in women with CHD to achieve an LDL-C 100 mg/dL and is also indicated in women with other atherosclerotic CVD or diabetes mellitus or 10-year absolute CHD risk > 20%
- A reduction to < 70 mg/dL is reasonable in very-high-risk women (e.g., those with recent ACS or multiple poorly controlled cardiovascular risk factors) with CHD and may require an LDL-C-lowering drug combination

**SOURCE:**

(1) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E, Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

**Coronary Artery Disease Mortality and Diabetes in Women**

- In a study of 116,000 subjects, aged 30-55, who were followed for 8 years, the risk of nonfatal and fatal CHD was > 6-fold that of women without diabetes
- Risks for all forms of CVD are elevated in women with type 1 and type 2 diabetes
- Women with diabetes are more likely to die from CHD than women without diabetes

**SOURCES:**

(1) Krolewski AS, et al. (1991). Evolving natural history of coronary artery disease in diabetes mellitus. *American Journal of Medicine*, 90, 56S-61S.

(2) National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). (2002).. 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) final report. *Circulation*, 106, 3143–3421.

**Race/Ethnicity and Diabetes**

- At elevated risk:
  - Latinas
  - American Indians
  - African Americans
  - Asian Americans



- Pacific Islanders

**SOURCE:**

(1) American Diabetes Association. (2011). Standards of Medical Care in Diabetes—2011. *Diabetes Care*, 34 (Supplement 1), S11-S61.

**Preventive Drug Interventions: Aspirin**

- High Risk Women:
  - Aspirin therapy (75 to 325 mg/d) should be used in women with CHD unless contraindicated
  - Aspirin therapy (75 to 325 mg/d) is reasonable in women with diabetes mellitus unless contraindicated
  - If a high-risk woman has an indication but is intolerant of aspirin therapy, clopidogrel should be substituted
- Other at-risk or healthy women:
  - Aspirin therapy can be useful in women  $\geq 65$  years of age, (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 the risk** of gastrointestinal bleeding and hemorrhagic stroke and may be reasonable for women  $< 65$  years for ischemic stroke prevention

**Interventions that are not useful/effective and may be harmful for the prevention of heart disease**

- The following should not be used for the primary or secondary prevention of CVD:
  - Antioxidant supplements and folic acid supplements
    - No cardiovascular benefit in randomized trials of primary and secondary prevention
    - Folic acid 0.4mg daily is recommended for reproductive aged women who may get pregnant to prevent neural tube defects
  - Selective estrogen-receptor modulators (SERMs)
  - Hormone therapy for menopause

**SOURCES:**

(1) Lee IM, Cook NR, Gaziano JM, Gordon D, Ridker PM, Manson JE, Hennekens CH, Buring JE. (2005). Vitamin E in the primary prevention of cardiovascular disease and cancer: the Women's Health Study: A randomized controlled trial. *Journal of the American Medical Association*, 294(1), 56-65

(2) Lonn E, Bosch J, Yusuf S, Sheridan P, Pogue J, Arnold JM, Ross C, Arnold A, Sleight P, Probstfield J, Dagenais GR; HOPE and HOPE-TOO Trial Investigators. (2005). Effects of long-term vitamin E supplementation on cardiovascular events and cancer: a randomized controlled trial. *Journal of the American Medical Association*, 293(11), 1338-47.

(3) Bønaa KH, Njølstad I, Ueland PM, Schirmer H, Tverdal A, Steigen T, Wang H, Nordrehaug JE, Arnesen E, Rasmussen K; NORVIT Trial Investigators. (2006). Homocysteine lowering and cardiovascular events after acute myocardial infarction. *New England Journal of Medicine*, 354(15), 1578-88.

(4) Loscalzo J. (2006). Homocysteine trials — Clear outcomes for complex reasons. *New England Journal of Medicine*, 354, 1629-1632.

(5) Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ, Lloyd-Jones DM, Newby LK, Piña IL, Roger VL, Shaw LJ, Zhao D, Beckie TM, Bushnell C, D'Armiento J, Kris-Etherton PM, Fang J, Ganiats TG, Gomes AS, Gracia CR, Haan CR, Jackson EA, Judelson DR, Kelepouris E, Lavie CJ, Moore A, Nussmeier NA, Ofili E,

Oparil S, Ouyang P, Pinn VW, Sherif K, Smith SC, Sopko G, Chandra-Strobos N, Urbina EM, Vaccarino V, Wenger NK. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 Update: A Guideline From the American Heart Association. *Circulation*, 123, 1243-1262.

The Women's Health Study, a 10-year randomized double-blind, placebo controlled trial of nearly 40,000 healthy women aged 45 years and older showed no cardiovascular benefit or risk to vitamin E supplementation (600 IU every other day) (1). The HOPE and HOPE-TOO trials performed in patients with CHD equivalent risk also found no benefit (2).

Multiple trials have shown no CHD benefit or a trend to harm for folic acid supplementation in patients with coronary artery disease or significant CHD risk (3), (4).

### **What the Experts Are Saying About Hormone Therapy and Cardiovascular Disease**

- NIH – “New analyses from the Women's Health Initiative (WHI) confirm that combination hormone therapy *increases* the risk of heart disease in healthy postmenopausal women. Researchers report a trend toward an increased risk of heart disease during the first two years of hormone therapy among women who began therapy within 10 years of menopause.”
  - From the “WHI Study Data Confirm Short-Term Heart Disease Risks of Combination Hormone Therapy for Postmenopausal Women,” *NIH News*, Monday, February 15, 2010  
Source: *Annals of Internal Medicine*, 152(4), 211-217
- American Congress of Obstetricians & Gynecologists (ACOG):
  - “Menopausal HT should not be used for the primary or secondary prevention of CHD at the present.”
  - “Hormone therapy use should be limited to the treatment of menopausal symptoms at the lowest effective dosage over the shortest duration possible and continued use should be reevaluated on a periodic basis.”

#### **SOURCES:**

(1) National Institutes of Health. “Menopausal Hormone Therapy Information.” Available at: <http://www.nih.gov/PHTindex.htm>.

(2) Toh SD, Hernández-Díaz S, Logan R, Rossouw JE, & Hernán MA. (2010). Coronary heart disease in postmenopausal recipients of estrogen plus progestin therapy: Does the increased risk ever disappear? A randomized trial. *Annals of Internal Medicine*, 152(4), 211-217.

(3) ACOG Committee Opinion No. 420, November 2008: Hormone therapy and heart disease. *Obstetrics & Gynecology*, 112(5), 1189-92.

### **Reproductive Age Women and CHD**

- Over 10,000 reproductive age women suffer MI or fatal CHD each year
- All women of reproductive age prescribed drug therapy should be counseled about preconception planning, as many recommended drugs are contraindicated during pregnancy
- Reproductive age women with CHD who are pregnant or planning pregnancy should be cared for by health care providers with expertise in both cardiovascular disease and obstetrics (team approach)

#### **SOURCES:**

(1) Rosamond W, Flegal K, Furie K, Go A, Greenlund K, Haase N, Hailpern SM, Ho M, Howard V, Kissela B, Kittner S, Lloyd-Jones D, McDermott M, Meigs J, Moy C, Nichol G, O'Donnell C, Roger V, Sorlie P, Steinberger J, Thom T, Wilson M, Hong Y, for the American Heart Association Statistics Committee and

Stroke Statistics Subcommittee (2008). AHA Statistical Update, Heart Disease and Stroke Statistics—2008 Update, A Report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*, 117, e25-e146.

(2) Janet Pregler, MD – personal communication, March 2005.

### **Conclusions**

- Gender differences exist in diagnosis, treatment, and prognosis of CHD
- Knowledge of gender differences is essential for appropriate therapy
- Evidence-based guidelines provide a framework for prevention and treatment of cardiovascular disease in women

### **The Heart Truth Professional Education Campaign Website**

[www.womenshealth.gov/heart-truth](http://www.womenshealth.gov/heart-truth)

### **Million Hearts Campaign Website**

[millionhearts.hhs.gov](http://millionhearts.hhs.gov)

**“Get involved and share your commitment to help prevent 1 million heart attacks and strokes in the next five years.”**