

**Cardiovascular Disease Prevention and Treatment 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 U.S. cardiovascular disease deaths from 1980-2007. While the number of 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 have 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

SLIDE INFORMATION 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.

This slide shows the number of CVD deaths by gender from 1980-2007. While the number of 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.

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.

(3) 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.

(4) 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.

(5) 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.

(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 Women's 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 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.

The Make the Call. Don't Miss a Beat. campaign is a national public education campaign that aims to educate, engage and empower women and their families to learn the seven most common symptoms of a heart attack and encourage them to call 9-1-1as soon as those symptoms arise.

Encourage Patients To

Make The Call. Don't Miss a Beat

- Only 53% of women said that 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.

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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.

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 CVD Risk using either lipids or BMI at www.framinghamheartstudy.org/risk/gencardio.html#

SOURCE:

<http://www.framinghamheartstudy.org>

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.

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 1st 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:

(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.

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 Ob/Gyn 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 < 200mg/dL
- BP < 120 mm Hg /< 80 mm Hg untreated
- Fasting blood sugar < 100mg/dL untreated,
- Body mass index < 25kg/m²
- Abstinence from smoking (never or quit > 12 months)
- Physical activity at goal
- DASH-like 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.

(3) 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.

(4) 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

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.

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 Demark 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 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
- Encourage use of 1-800-QUIT-NOW - free phone counseling and/or written materials
- 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) 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.

(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.

(3) 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).

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.

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

SOURCE:

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

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/m²
 - Waist circumference ≤ 35 inches
- Women can obtain a dietary plan customized to their weight and level of physical activity at www.choosemyplate.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.

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

SOURCE:

(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.

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.

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)

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.

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.

2004 Update of Adult Treatment Panel (ATP) III

- 5 recent clinical trials suggest added benefit of optional lowering of cholesterol more than ATP III recommended
- Lifestyle changes remain cornerstone of treatment
- Advises that intensity of LDL-C-lowering drug treatment in high-risk and moderately high-risk patients achieve at least 30% reduction in LDL-C levels

SOURCE:

(1) Grundy SM, et al. (2004). Implications of recent clinical trials for the National Cholesterol Education Program Adult Treatment Panel III guidelines. *Circulation*, 110, 227-239.

In July, 2004, some elements of the Adult Treatment Panel III were revisited, based on the completion of five clinical trials of cholesterol-lowering statin treatment that have been conducted since the release of the previous guidelines (1).

Lifestyle changes are still emphasized, including the adoption of a low saturated fat and low cholesterol diet, increased physical activity and weight control (1).

The update offers options for more intensive lowering of cholesterol levels for people at very high risk (1).

Adult Treatment Panel (ATP) III Guidelines for Statin Therapy: Very High Risk Women

- Those with recent ACS or multiple poorly controlled CV risk factors
- Recent heart attack or known CAD, along with one or more of the following:
 - Multiple major risk factors, particularly in diabetics
 - Severe or poorly controlled risk factors (i.e., continued smoking)
 - Multiple risk factors of the metabolic syndrome, especially TG ≥ 200 mg/dL AND HDL-C < 40 mg/dL
- LDL-C goal of < 100 mg/dL
- Consider statin, even if LDL-C < 100 mg/dL
- Optional LDL-C goal of < 70 mg/dL per ATP III 2004 update

SOURCE:

(1) Grundy SM, et al. (2004). Implications of recent clinical trials for the National Cholesterol Education Program Adult Treatment Panel III guidelines. *Circulation*, 110, 227-239.

A new category of “very high risk” was added in the update to ATP III in 2004 (1).

ATP III was updated based on the publication of five major clinical trials of statin therapy (1).

For women determined to be in a this “very-high risk” category lowering the LDL cholesterol to less than 100mg/dl, and as low as 70 mg/dl, may be considered (1).

Adult Treatment Panel (ATP) III Guidelines for Statin Therapy: High Risk Women

- $\geq 20\%$ 10-year risk of CHD
- CHD, large vessel atherosclerotic disease, DM
- Goal LDL-C < 100 mg/dL, consider statin even if LDL-C < 100 mg/dL

SOURCE:

(1) Grundy SM, et al. (2004). Implications of recent clinical trials for the National Cholesterol Education Program Adult Treatment Panel III guidelines. *Circulation*, 110, 227-239.

Adult Treatment Panel (ATP) III Guidelines for Statin Therapy: Multiple or Severe Risk Factors, 10-20% 10-Year CHD Risk

- Initiate drug therapy if LDL-C ≥ 130 mg/dL after lifestyle therapy
- Consider drug therapy if LDL-C ≥ 100 mg/dL after lifestyle therapy
- Goal LDL-C < 100 mg/dL

Framingham 10-year CHD Risk Calculator available at

<http://www.framinghamheartstudy.org/risk/coronary.html>

Adult Treatment Panel (ATP) III Guidelines for Statin Therapy: Multiple Risk Factors, 10-Year CHD Risk $< 10\%$

- Initiate drug therapy if LDL-C ≥ 160 mg/dL after lifestyle therapy

Framingham 10-year CHD Risk Calculator available at

<http://www.framinghamheartstudy.org/risk/coronary.html>

SOURCES:

(1) Grundy SM, et al. (2004). Implications of recent clinical trials for the National Cholesterol Education Program Adult Treatment Panel III guidelines. *Circulation*, 110, 227-239.

(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.

Adult Treatment Panel (ATP) III Guidelines for Statin Therapy: No Other Risk Factors, 10-Year CHD Risk $< 10\%$

- Initiate drug therapy if LDL-C ≥ 190 mg/dL after lifestyle therapy
- Drug therapy optional for LDL-C =160-189 mg/dL after lifestyle therapy

Framingham 10-year CHD Risk Calculator available at

<http://www.framinghamheartstudy.org/risk/coronary.html>

SOURCES:

(1) Grundy SM, et al. (2004). Implications of recent clinical trials for the National Cholesterol Education Program Adult Treatment Panel III guidelines. *Circulation*, 110, 227-239.

(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.

Diabetes

- Recommendation: Lifestyle and pharmacotherapy should be used as indicated in women with diabetes to achieve a 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.

Coronary 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 with CHD are more likely to die than women without diabetes with CHD

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 for Women with CHD

- Aspirin
- Beta-blockers
- Angiotensin converting enzyme inhibitors
- Angiotensin receptor blockers

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.

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 ≥ 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

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.

Benefits of Aspirin in Women with Established Coronary Artery Disease (CAD)

- Results of a prospective cohort study of 2,418 women with CAD showed that aspirin use significantly decreased both CVD and overall mortality at 3 years of follow-up. CVD mortality fell from 5.1% to 2.7% and all cause mortality fell from 9.1% to 5.1%

SOURCES:

(1) Harpaz D, et al. (1996). Effect of aspirin on mortality in women with symptomatic or silent myocardial ischemia. *American Journal of Cardiology*, 78, 1215-1219.

(2) ISIS-2 Collaborative Group. (1988). Randomized trial of intravenous streptokinase, oral aspirin, both, or neither. *Lancet*, 8607, 349-360.

(3) Antiplatelet Trialists' Collaboration. (1994). Collaborative overview of randomized trials of antiplatelet therapies in various categories of patients. *BMJ*, 308, 81-106.

In the randomized ISIS-2 trial, aspirin use decreased 5-week vascular mortality in women by 16.5% compared to placebo (2).

An overview of randomized trials of antiplatelet therapies published before 1990 suggested that women with prior vascular events randomized to antiplatelet therapy had a 25% reduction in subsequent vascular events (3).

Preventive Drug Interventions: Beta-Blockers

- Should be used for at least 12 months and up to 3 years in all women after MI or acute coronary syndrome with normal left ventricular function unless contraindicated
- Chronic beta-blocker therapy should be used indefinitely for women with left ventricular failure unless contraindications are present
- Chronic beta-blocker therapy may be considered in other women with coronary or vascular disease and normal left ventricular function

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.

Preventive Drug Interventions

- Angiotensin-Converting Enzyme (ACE) Inhibitors
 - Should be used (unless contraindicated) after MI, and in those women with clinical evidence of heart failure or an LVEF \leq 40% or diabetes mellitus
 - Note: ACE inhibitors are contraindicated in pregnancy and ought to be used with caution in women who may become pregnant
- Angiotensin-Receptor Blockers
 - Should be used in women who cannot tolerate angiotensin-converting enzyme inhibitors after MI, and in those women with clinical evidence of heart failure or an LVEF \leq 40% or diabetes mellitus, unless contraindicated

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.

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)

(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 hormone therapy 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.

Prevention of Cardiovascular Disease in Women

- Stratify women into high, at risk, and ideal risk categories
- Encourage lifestyle approaches
- Treat hypertension, lipid abnormalities, and diabetes
- Implement pharmacologic interventions for women at high and intermediate risk; pharmacologic interventions may be appropriate for some lower risk women
- Avoid initiating therapies without benefit, or where risks outweigh benefits

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 Heart Truth Professional Education Campaign Website

www.womenshealth.gov/heart-truth

Million Hearts Campaign Website

millionhearts.hhs.gov

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