Cardiovascular Disease Prevention and Advanced 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

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.

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 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.

(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.

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.

Classifications and Evidence

Classification and Levels of Evidence	Strength of Recommendation
Class I	Intervention is useful and effective
Class IIa	Weight of evidence/opinion is in favor of usefulness/efficacy
Class IIb	Usefulness/efficacy is less well established by evidence/opinion
Class III	Procedure/test not helpful or treatment has no proven benefit Procedure/test excess cost without benefit or harmful or treatment harmful to patients
Level of evidence A	Sufficient evidence from multiple randomized trials
Level of evidence B	Limited evidence from single randomized trial or other nonrandomized studies
Level of evidence C	Based on expert opinion, case studies, or standard of care

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.

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, and
- Diabetes mellitus
- End-stage or chronic kidney disease
- 10-year Framingham cardiovascular disease risk ≥ 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 ≥ 1 of the following risk factors for CVD, including (but not limited to):
- Cigarette smoking
- Hypertension: SBP ≥ 120 mm Hg, DBP ≥ 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:
- Any 3 of the following:
  - Abdominal obesity - waist circumference ≥ 35 in.,
  - High triglycerides ≥ 150 mg/dL,
  - Low HDL cholesterol < 50 mg/dL,
  - Elevated BP ≥ 130/85 mm Hg,
  - Fasting glucose ≥ 100 mg/dL,

SOURCES:
(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 threshhold 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 toxaemia 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/<80 mm Hg untreated
- Fasting blood sugar < 100 mg/dL untreated,
- Body mass index < 25 kg/m^2
- Abstinence from smoking (never or quit > 12 months)
- Physical activity at goal
- DASH ("Dietary Approaches to Stop Hypertension")-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
- Depression
- Omega-3 fatty acids
- Cardiac rehabilitation

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.

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
- 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.

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.

Physical Activity
- Consistently encourage the following:
    - Moderate Exercise – 150 minutes per week, <u>OR</u>
    - Vigorous Exercise – 75 minutes per week, <u>OR</u>
    - 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
- 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.

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 (1). This graph demonstrates mortality among non-smoking women at various BMI levels.

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 (1).

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 BMI and level of physical activity at:
    - 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.

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:

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 Health 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 1500mg 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 <u>avoid eating fish with the potential for the highest level of mercury contamination</u> (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).

Psychosocial Stressors in Women with Coronary Heart Disease (CHD): The Stockholm Female Coronary Risk Study
- Among women who were married or cohabitating with a male partner, marital stress was associated with nearly 3-fold increased risk of recurrent CHD events
- Living alone and work stress did not significantly increase recurrent CHD events

SOURCE:
(1) Orth-Gomer K, et al. (2000). Marital stress worsens prognosis in women with coronary heart disease. *Journal of the American Medical Association*, 283, 3008-3014.

Depression and CVD
- Depression is an independent predictor of CHD death among women with no history of CHD
- Screening and treatment for depression has not been shown to improve clinical outcomes, however,
- Depression may reduce adherence to CVD medications, therefore, screening is recommended for women with CVD

SOURCES:
(1) Wassertheil-Smoller S, et al. (2004). Depression and cardiovascular sequelae in postmenopausal women. The Women's Health Initiative (WHI). *Archives of Internal Medicine*, 164, 289-98.

(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.

Recently, an arm of the Women's Health Initiative reported findings on depression in 93,676 women with no baseline history of CHD. After an average of 4.1 years of follow-up, depression was an independent predictor of CHD death and all-cause mortality after adjustment for age, race, education, income, DM, HTN, smoking, body mass index, physical activity and increased cholesterol (1).

Whether identification and treatment of depression will lower CHD risk is unknown (1).

Omega-3 Fatty Acids
- Consumption of omega-3 fatty acids in the form of fish or in capsule form (e.g., EPA 1800mg/day) may be considered in women with hypercholesterolemia and/or hypertriglyceridemia for primary and secondary prevention (Class IIb; Level of Evidence B)
- Fish oil dietary supplements may have widely variable amounts of EPA and DHA (likely the only active ingredients)

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) Kris-Etherton PM, Harris WS, and Appel LJ. (2003). Omega-3 fatty acids and cardiovascular disease: New recommendations from the American Heart Association. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 23, 151-152.

Omega-3 polyunsaturated fatty acids are found in certain vegetable sources, as well as in fish oils (1). Clinical trials incorporating increased intake of omega-3 polyunsaturated acids as fatty fish, components of a "Mediterranean" diet, or fish oil capsules suggest that omega-3 fatty acids reduce sudden death and overall death in persons with coronary artery disease (1).

High intake of omega-3 fatty acids can cause excessive bleeding. Some types of fish can contain methylmercury, dioxin, and other environmental toxins (2).

Cardiac Rehabilitation
- A comprehensive risk reduction regimen should be recommended to women with recent acute coronary syndrome or coronary intervention, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease, or current/prior symptoms of heart failure and a Left Ventricular Ejection Fraction (LVEF) < 35%
- Risk reduction regimens may include:
  - Cardiac or stroke rehabilitation
  - Physician-guided home or community-based exercise training programs

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.

Major Risk Factor Interventions
- Blood Pressure
  - Target BP < 120/80 mm Hg
  - Pharmacotherapy if BP ≥ 140/90 mm Hg, or ≥ 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 NCEP/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 ≥ 140/90 mm Hg, recheck within 2 months, if confirmed, evaluate and treat or refer
  - If BP ≥ 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 ≥ 140/90 mm Hg or an even lower blood pressure in the setting of diabetes or target-organ damage (≥ 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.

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 equals total cholesterol minus HDL)

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.

Treatable Risk Factors: The Epidemiology of Cholesterol Levels and Subfractions
- Low HDL-C more important in women than men
  - For every 1 mg/dL increase in HDL-C 3% decrease in CHD risk for women and 2% decrease in CHD risk for men
- Triglyceride elevation associated with greater atherogenic significance in women than in men

SOURCE:
(1) Maron DJ. (2000). The epidemiology of low levels of high-density lipoprotein cholesterol in patients with and without coronary artery disease. *American Journal of Cardiology*, 86, 11L-14L.

Treatable Risk Factors: Cholesterol Level and Subfractions
- LDL-C > 160 mg/dL associated with 3.3-fold elevation in risk for women less than 65 years old
- LDL-C pattern of small, dense particles (more atherogenic) present in 25% of population, but less frequently seen in women
- Menopausal transition associated with increasing proportion of this subfraction

SOURCES:
(1) Keil U. (2000). Coronary artery disease: the role of lipids, hypertension, and smoking. *Basic Research in Cardiology*, 95, I52-I58.

(2) Carr MC, et al. (2000). Changes in LDL density across the menopausal transition. *Journal of Investigative Medicine*, 48, 245-250.

(3) Hokanson JE, Austin MA. (1996). Plasma triglyceride level is a risk factor for cardiovascular disease independent of high-density lipoprotein cholesterol level: a meta-analysis of population-based prospective studies. *Journal of Cardiovascular Risk*, 3, 213-219.

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.

High-Sensitivity C-Reactive Protein (hsCRP)
- hsCRP should not be used for routine screening of all women, but should be reserved for refining risk estimates in intermediate risk patients when there is uncertainty regarding the need to start drug therapy

- Consider statins in women over 60 years of age if, after lifestyle modification, hsCRP remains elevated above 2 mg/dL and no acute inflammatory process is present *(Class IIb; Level of Evidence B)*

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) Ridker PM, Danielson E, Fonseca FA, Genest J, Gotto AM Jr, Kastelein JJ, Koenig W, Libby P, Lorenzatti AJ, Macfadyen JG, Nordestgaard BG, Shepherd J, Willerson JT, Glynn RJ; JUPITER Trial Study Group. (2009). Reduction in C-reactive protein and LDL cholesterol and cardiovascular event rates after initiation of rosuvastatin: A prospective study of the JUPITER trial. *Lancet*, 373(9670), 1175-82.

The role that novel CVD risk biomarkers (e.g., hsCRP or advanced lipid testing) and imaging technologies (e.g., coronary calcium scoring assessment) should play in risk assessment and in delineation of appropriate preventive interventions is not yet well-defined. It should be noted that JUPITER did not test a strategy of routine screening with hsCRP to determine benefit of statin therapy, because those with lower hsCRP levels were not studied (2).

These approaches should not be used for routine screening of all women. Instead, the American Heart Association and other national groups have recommended that the use of these novel modalities should be reserved for refining risk estimates in intermediate risk patients (defined either as 10% to 20% or 6% to 20% 10-year risk) when there is uncertainty regarding the need to start drug therapy.

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
- ≥ 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

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: 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.

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: 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, (81mg daily or 100mg every other day) if blood pressure is controlled and benefit for ischemic stroke and MI prevention is **likely to outweigh risk** of gastrointestinal bleeding and hemorrhagic stroke and may be reasonable for women < 65 years for ischemic stroke prevention

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) 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

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.

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:

(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 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."