

**2011 AHA Guidelines for Cardiovascular Disease Prevention in Women:
For Obstetrician-Gynecologists and other Reproductive Health Professionals**

Objectives:

- To recognize reproductive health professionals’ unique opportunity to evaluate and manage cardiovascular risk in women and the importance of reproductive history in this evaluation;
- To discuss strategies to successfully incorporate cardiovascular disease prevention into routine care of women; and
- To summarize recommended approaches to the prevention of cardiovascular disease in women, including tools to successfully motivate patients in facing the challenge of adopting healthier behaviors.

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>.

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, the number of cardiovascular deaths for women remained flat or increased slightly during the 1980s and 1990s. Despite the fact that age-adjusted CVD mortality rates in men have exceeded those in women during this period, the number of deaths for women has exceeded those for men for 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.

Cardiovascular Disease Prevention in Ob/Gyn Practice over the Lifespan:

- C.R. is a 22 year old Latina who presents for postpartum check. She was diagnosed with gestational diabetes.
- D.H. is a 35 year old Asian-American woman who presents to discuss contraception. She is overweight, and asks for dietary and exercise advice.
- A.D. is a 56 year old African American woman who presents for routine preventive care. Her sister, who is 59, just had a heart attack, and she asks how she can reduce her risk.

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 lifestyles 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.

Definition of Metabolic Syndrome in Women:

- Any 3 of the following:
 - Abdominal obesity - waist circumference \geq 35 in.,
 - High triglycerides \geq 150 mg/dL,
 - Low HDL-C 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:

- Pregnancy-induced Hypertension, Gestational Diabetes (GDM), Polycystic Ovary Syndrome (PCOS);
- Hypertension (HTN), Diabetes, Hyperlipidemia;
- Smoking, Overweight/Obesity, Unhealthy Diet, Lack of Exercise.

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) 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), 2038-2049.

Diagnoses in Ob/Gyn: Impact on CVD risk in Selected Studies, 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), 2038-2049.

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

Pregnancy is a “metabolic stress test” that predicts development of future cardiovascular risk factors

Several diagnoses carry significant risk of subsequent manifestations of metabolic syndrome and ultimately CVD:

- Women with preeclampsia are 3.8 times more likely to develop diabetes, and 11.6 times more likely to develop hypertension requiring drug treatment

- Up to 70% of women with gestational diabetes develop Type 2 diabetes within 5 years of the pregnancy

SOURCES:

(1) Magnussen EB, et al. (2009). Hypertensive disorders in pregnancy and subsequently measured cardiovascular risk factors. *Obstetrics & Gynecology*, 114, 961-70.

(2) Kim C, et al. (2002). Gestational diabetes and the incidence of type 2 diabetes: A systematic review. *Diabetes Care*, 25(10), 1862-1868.

Pregnancy provides a metabolic “stress test” that can cause hypertension and diabetes to manifest. Although hypertension and diabetes may regress post-partum, they are very likely to manifest again as affected women age.

Women with Polycystic Ovary Syndrome are Highly Likely to Develop Risk Factors for CVD

- PCOS Patients have a 5-fold risk of developing Type 2 diabetes compared to age and weight-matched controls;
- Up to 70% of them have dyslipidemia,
- Metabolic syndrome is present in about 40%,
- Metabolic manifestations are less common in non-obese PCOS patients.

SOURCES:

(1) Boudreaux MY, et al. (2006). Risk of T2DM and impaired fasting glucose among PCOS subjects: results of an 8-year follow up. *Current Diabetes Reports*, 6(1), 77-83.

(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), 2038-2049.

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#

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 $\geq 10\%$ [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 ≥ 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.

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

- Total cholesterol < 200 mg/dL
- BP < 120/<80 mm Hg untreated
- Fasting blood sugar < 100 mg/dL untreated,
- Body mass index < 25 kg/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).

Incorporating Cardiovascular Preventive Care into Women's Health Care

At every visit:

- Measure blood pressure
- Ask about tobacco use
- Measure body mass index

At least every 3 years:

- Measure fasting glucose, hemoglobin A1C, or 2 hour 75 gm glucose tolerance test for women with a BMI ≥ 25 kg/m² and additional risk factors, including:
 - PCOS
 - Acanthosis nigricans
 - Severe obesity
 - Physical inactivity
 - First degree relative with DM
 - High risk ethnicity (African American, Latino, Native American, Asian American, Pacific Islander)
 - Hypertension
 - CVD
 - HDL-C < 35 mg/dl or triglycerides > 250 mg/dl
- Also measure fasting glucose, hemoglobin A1C, or 2 hour 75 gm glucose tolerance test for Women age ≥ 45 and women who delivered a baby weighing > 9 lbs. or were diagnosed with gestational diabetes
- At least every 3 years also update family history, diet, and exercise information, and update and consider obstetrical history

At least every 5 years:

- Measure fasting lipid panel (starting at age 20)

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.

(3) American Diabetes Association. (2010). Diagnosis and treatment of diabetes mellitus. *Diabetes Care*, 33 (Supplement 1), S62-S69.

Note: At-risk BMI may be lower in some ethnic groups.

For those interested in other guidelines:

The American College of Obstetricians and Gynecologists recommends performing lipid profile assessments (or lipid screening) every 5 years, starting at age 45.

Source: ACOG Committee Opinion No. 483: Primary and preventive care: periodic assessments. (2011). *Obstetrics & Gynecology*, 117(4), 1008-15.

Screening Women at Increased Risk

The USPSTF strongly recommends screening women aged 45 and older for lipid disorders if they are at increased risk for coronary heart disease. Grade: A Recommendation.

The USPSTF recommends screening women aged 20 to 45 for lipid disorders if they are at increased risk for coronary heart disease. Grade: B Recommendation.

Screening Young Men and All Women Not at Increased Risk

The USPSTF makes no recommendation for or against routine screening for lipid disorders in men aged 20 to 35, or in women aged 20 and older who are not at increased risk for coronary heart disease.

Grade: C Recommendation.

Major Risk Factor Interventions

- Blood Pressure
- Lipids
- Diabetes

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.

SOURCE:

(1) Chobanian AV, Bakris GL, Black HR, , Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Roccella EJ; Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. (2003). National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension*, 42, 1206-1252.

Care for Women with Hypertension

- Measure BP at each visit
- Provide patient with a written report of BP and pulse

- If BP is elevated, encourage patient to follow up with the physician who is actively managing her BP
- Consider informing hypertension treating physician with your results

SOURCE:

(1) Lewis V, Barnhart J, Houghton JL, Charney P. (2010). A brief office educational intervention improved referral rates for hypertension control in women. *International Journal of Cardiology*, 139(2), 204-206.

Hyperlipidemia and Cardiovascular Preventive Care

- Evaluation and consideration of statin treatment or referral for statin treatment is currently recommended for women with:
 - LDL-C > 190
 - LDL-C > 130-160 and cardiac risk factors
 - LDL-C > 100 and diabetes, CAD, or equivalent (high risk)
 - Some experts recommend treatment for women with LDL-C > 70, CAD, and multiple other risk factors
- Complications of statin use may include elevation of liver transaminases and myopathy. Liver transaminases are generally checked before initiating statin treatment, and within 2 months after.
- Consultation is recommended if statin treatment is considered for patients with liver disease, renal failure, or other complex medical conditions.
- Consider testing for hypothyroidism in women with dyslipidemia

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.

Coronary Disease Mortality & Diabetes in Women:

- 116,000 subjects, aged 30-55, 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.

Diabetes and Cardiovascular Preventive Care

- DM (require treatment and ongoing monitoring for end-organ complications)
 - HbA1C \geq 6.5%
 - Fasting plasma glucose $>$ 126 mg/dL
 - 2 hr plasma glucose \geq 200 mg/dL after 75 gm glucose load
- Increased risk for diabetes (counsel regarding lifestyle and monitor, consider referral, drug treatment sometimes recommended)
 - HbA1C 5.7-6.4%
 - Fasting plasma glucose 100-125 mg/dL
 - 2 hr plasma glucose 140-199 mg/dL after 75 gm glucose load

SOURCE:

(1) American Diabetes Association. (2010). Diagnosis and treatment of diabetes mellitus. *Diabetes Care*, 33 (Supplement 1), S62-S69.

Postpartum Risk – Gestational Diabetes

The frequency of partpartum follow-up for women diagnosed with gestational diabetes (GDM) is low – 33.7% in a recent cohort study of 745 women

American Diabetes Association 2010 Guidelines:

- Women with GDM should be screened 6 – 12 weeks postpartum and should be followed up with subsequent screening for the development of diabetes or pre-diabetes at least every three years
- Acceptable screening protocols are fasting glucose, hemoglobin A1C, or 2 hour 75 gm glucose tolerance test
- The International Association of Diabetes and Pregnancy Study Groups recommended that high-risk women found to have diabetes at their initial prenatal visit using the standard criteria receive a diagnosis of overt, not gestational, diabetes.

SOURCES:

(1) Stasenko M, Cheng YW, McLean T, Jelin AC, Rand L, & Caughey AB. (2010). Postpartum follow-up for women with gestational diabetes mellitus. *American Journal of Perinatology*, 27(9), 737-742.

(2) American Diabetes Association. (2010). Diagnosis and treatment of diabetes mellitus. *Diabetes Care*, 33 (Supplement 1), S62-S69.

Recommendations

- Screen for GDM using risk factor analysis and, if appropriate, an OGTT.
- Women with GDM should be screened for diabetes 6–12 weeks postpartum and should be followed up with subsequent screening for the development of diabetes or pre-diabetes.

Information on the National Diabetes Education Program (NDEP) campaign to prevent type 2 diabetes in women with GDM can be found at http://ndep.nih.gov/media/NeverTooEarly_Tipsheet.pdf.

Lifestyle Approaches to Major Risk Factors

- Blood Pressure
- Lipids
- Diabetes

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.

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.

Lifestyle Approaches: DASH (“Dietary Approaches to Stop Hypertension”) Eating Plan

- 7–8 servings of grains, grain products daily
- 4–5 servings of vegetables daily
- 4–5 servings of fruits daily
- 2–3 servings of low-fat or nonfat dairy foods daily
- ≤2 servings of meats, poultry, fish daily
- 4–5 servings of nuts, seeds, legumes weekly
- Limited intake of fats, sweets

www.dashdiet.org

SOURCES:

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

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

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

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

Lifestyle Approaches: 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.

Lifestyle Approaches: Dietary Modification and Lipid Control

- In high-risk women or when LDL-C is elevated:
 - Saturated fat < 7% of calories
 - Cholesterol < 150 mg/day
 - Reduce trans fatty acids
 - Major dietary sources are foods baked and fried with partially hydrogenated vegetable oil
 - Refer and ensure follow-up at each visit

SOURCES:

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

(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.

In all women with an elevated LDL cholesterol level, therapeutic lifestyle changes should be instituted.

(1)

There is no upper limit of trans-fatty acids identified, as yet. (2)

Lifestyle Approaches: 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.

Lifestyle Approaches: Breastfeeding May Reduce Subsequent Maternal Risk of Type 2 Diabetes

- There is a 50% lower prevalence of type 2 diabetes at 12-16 weeks postpartum among women with GDM who breastfeed compared to those who do not
- Women with GDM who breastfeed may be less likely to develop metabolic syndrome than those who do not

SOURCE:

(1) Gunderson EP, Jacobs DR Jr, Chiang V, Lewis CE, Feng J, Quesenberry CP Jr, Sidney S. (2010). Duration of lactation and incidence of the metabolic syndrome in women of reproductive age according to gestational diabetes mellitus status: a 20-Year prospective study in CARDIA (Coronary Artery Risk Development in Young Adults). *Diabetes*, 59(2), 495-504.

Additional information from the Agency for Healthcare Research and Quality (AHRQ) available at: (<http://www.ahrq.gov/clinic/tp/brfouttp.htm#Report>):

Objectives: We reviewed the evidence on the effects of breastfeeding on short- and long-term infant and maternal health outcomes in developed countries.

Results: We screened over 9,000 abstracts. Forty-three primary studies on infant health outcomes, 43 primary studies on maternal health outcomes, and 29 systematic reviews or meta-analyses that covered approximately 400 individual studies were included in this review.

For maternal outcomes, a history of lactation was associated with a reduced risk of type 2 diabetes, breast, and ovarian cancer. Early cessation of breastfeeding or not breastfeeding was associated with an increased risk of maternal postpartum depression. There was no relationship between a history of lactation and the risk of osteoporosis. The effect of breastfeeding in mothers on return-to-pre-pregnancy weight was negligible, and the effect of breastfeeding on postpartum weight loss was unclear.

Other Lifestyle Interventions for All Women

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

SOURCE:

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

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

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

Lifestyle Interventions: Adherence to Low Risk Lifestyle Reduces Risk of Cardiac Events

- 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.

SOURCES:

(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.

(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 Interventions: 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.

Lifestyle Interventions: 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.

Lifestyle Interventions: 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)

Lifestyle Interventions: 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:

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 Interventions: 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.

Lifestyle Interventions: 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 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).

Pregnancy Is an Opportunity to Quit Smoking and Prevent Relapse

- 45.7% of women smokers quit smoking during pregnancy.
- A combination of interventions - motivational interviewing, support groups, counseling, quit lines, financial incentives, etc. - may result in more successful prevention of smoking during pregnancy.
- Preventing relapse is difficult: 53% of the women who quit smoking during pregnancy relapsed within 4 months of delivery.
- A meta-analysis of smoking cessation counseling in pregnant women found that physician counseling alone was not effective at preventing relapse during or after pregnancy.

- The reasons women relapse are complex. Clinicians should continue to support women's cessation efforts during the post-partum period.

SOURCES:

(1) Tong VT, Jones JR, Dietz PM, D'Angelo D, & Bombard JM (2009). Trends in smoking before, during, and after pregnancy - Pregnancy risk assessment monitoring system (PRAMS), United States, 31 sites, 2000-2005. *Morbidity and Mortality Weekly Report*, 58 (SS-4), 1-29.

(2) Fiore MC, Jaén CR, Baker TB, et al. (2008). Treating Tobacco Use and Dependence: 2008 Update. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service. Available at: www.surgeongeneral.gov/tobacco/treating_tobacco_use08.pdf.

(3) Fang WL, Goldstein, AO, Butzen AY, Hartsock SA, Hartmann KE, Helton M, Lohr, JA. (2004). Smoking cessation in pregnancy: A review of postpartum relapse prevention strategies. *Journal of the American Board of Family Medicine*, 17(4), 264-275.

(4) Fillion K, Abenhaim H, Mottillo S, Joseph L, Gervais A, O'Loughlin J, Paradis G, Pihl R, Pilote L, Rinfret S, Tremblay M, Eisenberg M. (2011). The effect of smoking cessation counselling in pregnant women: a meta-analysis of randomised controlled trials. *British Journal of Obstetrics and Gynecology*, 118(12), 1422-1428.

Among the complex reasons for post-partum smoking relapse are:

- Fear of weight gain
- Difficulties managing stress, e.g., care of newborn
- Weaning from breast-feeding
- Partners who smoke
- Familiar cues such as drinking alcohol or coffee/tea, after meals, on the phone, in the car, etc.
- Trying to relax
- Feeling sad and irritable

Source: Fang et al 2004.

Changing Behavior

- Most of the *Heart Truth* lifestyle interventions deal with modifiable behaviors
- There are techniques that can help you help your patients:
 - Quit smoking
 - Increase physical activity
 - Improve diet
 - Maintain weight loss

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.

Changing Behavior

- Motivational interviewing is a collaborative, person-centered form of guiding to elicit and strengthen motivation for change
- More information can be found at www.womenshealth.gov/hearttruth/

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.

Other Medication Issues

- Aspirin
- Antioxidants
- SERMS
- Hormone therapy for menopause

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.

Preventive Drug Interventions: Aspirin

- High Risk Women:
 - Aspirin therapy (75 to 325 mg/d) should be used in women with CHD unless contraindicated
 - Aspirin therapy (75 to 325 mg/d) is reasonable in women with diabetes mellitus unless contraindicated
 - If a high-risk woman has an indication but is intolerant of aspirin therapy, clopidogrel should be substituted
- Other at-risk or healthy women:
 - Aspirin therapy can be useful in women \geq 65 years of age, (81 mg daily or 100 mg every other day) if blood pressure is controlled and benefit for ischemic stroke and MI prevention is **likely to outweigh the risk** of gastrointestinal bleeding and hemorrhagic stroke and may be reasonable for women $<$ 65 years for ischemic stroke prevention

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.”
—“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.

Estrogen Alone Caused Stroke in Women's Health Initiative Study

- Women randomized to conjugated equine estrogen (CEE) for an average of 6.8 years had statistically significantly more strokes compared to placebo (Hazard Ratio 1.39)
- Statistical analysis did not show that the risk of stroke was affected by age of initiation of therapy
- Follow-up studies showed the risk of stroke was no longer elevated once CEE was discontinued

SOURCES:

(1) Anderson GL, Limacher M, Assaf AR, Bassford T, Beresford SA, Black H, Bonds D, Brunner R, Brzyski R, Caan B, Chlebowski R, Curb D, Gass M, Hays J, Heiss G, Hendrix S, Howard BV, Hsia J, Hubbell A, Jackson R, Johnson KC, Judd H, Kotchen JM, Kuller L, LaCroix AZ, Lane D, Langer RD, Lasser N, Lewis CE, Manson J, Margolis K, Ockene J, O'Sullivan MJ, Phillips L, Prentice RL, Ritenbaugh C, Robbins J, Rossouw JE, Sarto G, Stefanick ML, Van Horn L, Wactawski-Wende J, Wallace R, Wassertheil-Smoller S; Women's Health Initiative Steering Committee. (2004). Effects of conjugated equine estrogen in postmenopausal women with hysterectomy: the Women's Health Initiative randomized controlled trial. *Journal of the American Medical Association*, 291(14), 1701-12.

(2) LaCroix AZ, Chlebowski RT, Manson JE, et al. (2011). Health outcomes after stopping conjugated equine estrogens among postmenopausal women with prior hysterectomy. *Journal of the American Medical Association*, 305(13), 1305-1314.

Estrogen Alone Did Not Effect CHD Events in WHI; After Cessation of Estrogen, Younger Women Who Had Taken Conjugated Equine Estrogen (CEE) Had Fewer CHD Events

SOURCES:

(1) Anderson GL, Limacher M, Assaf AR, Bassford T, Beresford SA, Black H, Bonds D, Brunner R, Brzyski R, Caan B, Chlebowski R, Curb D, Gass M, Hays J, Heiss G, Hendrix S, Howard BV, Hsia J, Hubbell A, Jackson R, Johnson KC, Judd H, Kotchen JM, Kuller L, LaCroix AZ, Lane D, Langer RD, Lasser N, Lewis CE, Manson J, Margolis K, Ockene J, O'Sullivan MJ, Phillips L, Prentice RL, Ritenbaugh C, Robbins J, Rossouw JE, Sarto G, Stefanick ML, Van Horn L, Wactawski-Wende J, Wallace R, Wassertheil-Smoller S; Women's Health Initiative Steering Committee. (2004). Effects of conjugated equine estrogen in postmenopausal women with hysterectomy: the Women's Health Initiative randomized controlled trial. *Journal of the American Medical Association*, 291(14), 1701-12.

(2) LaCroix AZ, Chlebowski RT, Manson JE, et al. (2011). Health outcomes after stopping conjugated equine estrogens among postmenopausal women with prior hysterectomy. *Journal of the American Medical Association*, 305(13), 1305-1314.

Ongoing Studies About Hormone Therapy (HT): Does the Timing and Type of Estrogen Matter?

- **KEEPS: Kronos Early Estrogen Prevention Study**
 - 660 women aged 48-52, randomized to placebo, oral conjugated equine estrogen, or transdermal 17 beta-estradiol with placebo or pulsed progesterone for 12 days/month

- Endpoint: Progression of atherosclerosis measured by carotid intima media thickness and coronary artery calcification
- **ELITE: Early versus Late Intervention Trial with Estradiol**
 - 504 women either less than 6 years from menopause or more than 10 years from menopause randomized to oral 17 beta-estradiol or placebo, with progesterone gel or placebo
 - Endpoint: Progression of atherosclerosis measured by carotid intima media thickness

SOURCES:

(1) Miller VM, et al. (2009). Using basic science to design a clinical trial: Baseline characteristics of women enrolled in the Kronos Early Estrogen Prevention Study (KEEPS). *Journal of Cardiovascular Translational Research*, 2, 228-239.

(2) Clinical trial: ELITE: Early Versus Late Intervention Trial With Estradiol. Available at: <http://clinicaltrials.gov/ct2/show/NCT00114517>.

What the Experts Are Saying About Hormone Therapy and Cardiovascular Disease

American Congress of Obstetricians & Gynecologists (ACOG):

- “Menopausal hormone therapy (HT) should not be used for the primary or secondary prevention of CHD at the present.”
- “Hormone therapy use should be limited to the treatment of menopausal symptoms at the lowest effective dosage over the shortest duration possible and continued use should be reevaluated on a periodic basis.”

SOURCE:

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

Educate Patients About the Warning Symptoms of a Heart Attack

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

SOURCES:

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

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

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 9-1-1 as soon as those symptoms arise.

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

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

SOURCES:

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

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

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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.”