Cardiovascular Disease in Women: Risk Factors

Cardiovascular Risk Factors in Women

- Unmodifiable
  - Age
  - Family History
- Modifiable
  - Diabetes
  - Dyslipidemia
  - Hypertension
  - Obesity
  - Poor Diet
  - Sedentary Lifestyle
  - Cigarette Smoking

SOURCES:

(1) 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.

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

Modifiable Risk Factors: Sedentary Lifestyle

- 40% of women report no leisure time physical activity
- Exercise is less prevalent among white women compared to white men
- African American and Hispanic women have the lowest prevalence of leisure time physical activity

SOURCES:

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

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

Estimated Percentage of Americans Age 18 and Older Who Report Regular Physical Activity 2005: By Race and Sex

Caucasian men	Caucasian women	African American men	African American women	Hispanic men	Hispanic women
52.5%	49.8%	45.9%	42.3%	42.5%	42.3%

SOURCE:

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

Regular physical activity is defined as engaging in moderate-intensity physical activity for > 30 minutes per day, > 5 days per week, or vigorous-intensity physical activity for > 20 minutes per day, > 3 days per week.

Risk Reduction for CHD Associated with Exercise in Women

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

SOURCE:

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

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

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

SOURCES:

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

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

Smoking

- The same treatments benefit both women and men
- Women face different barriers to quitting
  - Concomitant depression
  - Concerns about weight gain

SOURCE:

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

Five A's

- **A**sk about tobacco use at every visit
- **A**dvise in a clear and personalized message
- **A**ssess willingness to quit
- **A**ssist to quit
- **A**rrange follow-up

SOURCE:

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

The 5 A's are designed to be a brief intervention for engaging patients in conversation about smoking cessation.
ASK about tobacco use at every opportunity; include in vitals signs; stickers on charts or other reminders for physicians, other healthcare providers, and staff.
ADVISE In a clear, strong message, advise them to quit. Personalize the message if possible.
ASSESS willingness to quit; this is an important tool to see where they are in the process of change. How does the patient view it?
ASSIST to quit; iscuss how others have done it and how you can help them too.
ARRANGE follow up; schedule follow up visits, phone calls (1).

Obesity Trends: 1990-2010

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

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

Body Mass Index: Definition

- BMI = weight in kilograms divided by the square of the height in meters (kg/m2)
- BMI chart showing BMI based on weight in pounds and height in inches available at http://www.nhlbi.nih.gov/guidelines/obesity
- Downloadable BMI calculator phone applications are available from the National Heart, Lung, & Blood Institute (NHLBI) website above.

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

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.

Adult Treatment Panel (ATP) III Guidelines

- Sample menus for different ethnic & cultural preferences
- Assessment tools
- Counseling tools
- Adherence tips
- Patient handouts

SOURCE:

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

The ATP III full report document has several chapters devoted to suggestions on dietary management (1).

Some resources in the ATP III document include sample menus for different ethnic and cultural preferences, assessment tools to facilitate counseling women, tips on adherence and patient hand-outs (1).

Diabetes

- Diabetes affects 8.8% of all U.S. women age 20 years or older
- Compared to whites:
    - African Americans, Latinas, American Indians, Asian Americans, and Pacific Islanders have a 1.5-2.2 times greater prevalence of diabetes

SOURCE:

(1) National Diabetes Information Clearinghouse. Available at: http://diabetes.niddk.nih.gov/dm/pubs/statistics/index.htm#7. Accessed April 3, 2008

Diabetes

- 65% of people with diabetes die of cardiovascular disease
- People with diabetes have death rates from heart disease that are 2 to 4 times higher than people without diabetes

SOURCE:

(1) Centers for Disease Control and Prevention, Department of Health and Human Services. National Diabetes Fact Sheet, 2011. Available at: http://www.cdc.gov/diabetes/pubs/factsheet11.htm. Accessed October 12, 2011.

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 type 1 and type 2 diabetics
- 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 high 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.

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.

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. 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.

Treatable Risk Factors: Hypertension

- 32% of women in the United States have hypertension
- Hypertension is more prevalent among older women than older men
- Death from CHD progresses increasingly and linearly as blood pressure increases
- For every 20 mm Hg systolic or 10 mm Hg diagnostic increase in blood pressure, risk of death from CHD doubles

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) 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.

(3) 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.

Lifestyle Approaches to 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) 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.

(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.

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)

- Classification of blood pressure
- Treatment algorithms
- Lifestyle strategies
- Antihypertensive drug choices
- Special indications and situations
- Resistant hypertension

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 [JNC] on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension*, 42, 1206-1252.

The JNC 7 report serves as a reference for the treatment of hypertension. It covers lifestyle strategies (including detailed diet information), drug choices and special indications and situations, such as what medications work best in different populations (1).

Age-adjusted Prevalence of Hypertension in the U.S.

White	Black	Mexican American
27.4%	40.5%	25.1%

SOURCE:

(1) Centers for Disease Control and Prevention. (2005). Racial/Ethnic Disparities in Prevalence, Treatment, and Control of Hypertension—United States, 1999—2002. *Morbidity & Mortality Weekly Report*, 54(01), 7-9.

Prevalence of Hypertension Among White and Black Women in the United States

	1988-1994	1999-2002
Black women	38%	44%
White women	24%	30%

The prevalence of hypertension in blacks in the United States is among the highest in the world, and it is increasing.

SOURCE:

(1) Hertz RP, Unger AN, Cornell JA, Saunders E. (2005). Racial disparities in hypertension prevalence, awareness and management. *Archives of Internal Medicine*, 165, 2098–2104.

Prevalence of High Blood Pressure by Age and Race (2005-2008)

	20-44	45-64	64-74	75+
African American men	18.5%	57.9%	74.8%	
African American women	17.2%	62.4%	88.8%	
Caucasian men	14.8%	38.4%	64.9%	67.2%
Caucasian women	7.2%	37.9%	66.4%	79.4%

African Americans are more likely to have high blood pressure than Caucasians and this occurs at earlier ages.

SOURCE:

(1) CDC, National Vital Statistics System, Health, United States, 2005-2008.

African Americans and Hypertension

- Compared to whites
    - African Americans develop hypertension earlier in life
    - African Americans have much higher average blood pressures
    - African Americans have a 1.5 times greater risk of heart disease death

SOURCE:

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

In all ethnic groups, the etiology of hypertension is multifactorial, and may include the contributions of a variety of factors including diet, stress, cardiovascular reactivity, body weight, nephron number, and hormonal systems (1).

In the Hypertension Detection and Follow-up Program, when medications and provider services were free of charge, African Americans benefited more than whites (1).
The low sodium DASH ("Dietary Approaches to Stop Hypertension") eating plan was associated with greater reductions in BP in African Americans than in other demographic subgroups (1).

"Dietary Approaches to Stop Hypertension" (DASH) Eating Plan

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

www.dashdiet.org

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.

Approximate and Cumulative LDL Cholesterol Reduction Achievable By Diet and Weight Loss Modifications

Dietary Component	Dietary Change	Approximate LDL Reduction
Major		
Saturated fat	< 7% of calories	8-10%

Dietary cholesterol*	< 200 mg/day *guidelines recommend < 150mg/day	3-5%
Weight reduction	Lose 10 lbs	5-8%
Other LDL-lowering options		
Viscous fiber	5-10 g/day	3-5%
Plant sterol/stanol esters	2 g/day	6-15%

* Note: New guideline recommends < 150 mg/day

SOURCE:

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

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

Adult Treatment Panel (ATP) III Full Report

- How to choose a statin
- Dosing regimens
- How to monitor when combining drugs
- Side effect management
- Reprintable nutritional hand-outs
- Menu samples for different cultures
- Adherence strategies/barrier reduction

SOURCE:

(1) 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.

The full report of the ATP III is an excellent resource, with sample menus appropriate for patients of different racial and ethnic backgrounds, assessment tools to more effectively use counseling time, tips on adherence and patient hand-outs.

The full report discusses how to choose a statin, dosing regimens and how to monitor when combining several drugs together.

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.

Emerging Risk Factors for CHD

- Pro-inflammatory markers
    - High sensitivity-C-reactive protein (hs-CRP)
    - Fibrinogen
- Hyperhomocysteinemia
    - Homocysteine lowering to prevent CHD events has been shown to be ineffective or possibly harmful in randomized clinical trials

SOURCES:

(1) 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.

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

(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.

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).

Relative Risk of CV Events According to Baseline Levels of High Sensitivity C-reactive protein (hs-CRP) in Healthy Postmenopausal Women

- C-reactive protein is a serum inflammatory marker. Currently, high sensitivity (hs) C-reactive protein appears to be the most reliable inflammatory marker
- Ridker et al. demonstrated a strong correlation between risk of CV events and increased level of hs-CRP. This marker has been shown to distinguish between women at high risk and at low risk, even in women with LDL less than 130 mg/dL
- The extent to which hs-CRP measurement provides additional benefit in terms of CHD risk screening and CHD prevention is uncertain. Routine measurement of hs-CPR is not recommended

SOURCES:

(1) 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.

(2) Ridker PM, Hennekens CH, Buring JE, Rifai N. (2000). C-reactive protein and other markers of inflammation in the prediction of cardiovascular disease in women. *New England Journal of Medicine*, 342(12), 836-43.

Fibrinogen Levels and CHD Risk in Women

- Fibrinogen is a hemostatic factor associated with CHD risk
- A high fibrinogen level is associated with increased risk of coronary events, independent of cholesterol level
- Measurement of fibrinogen is not recommended as part of routine assessment of CHD risk. Clinical trials of specific therapeutic interventions have not yet been carried out

SOURCE:
(1) Eriksson M, et al. (1999). Relationship between plasma fibrinogen and coronary heart disease in women. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 19, 67-72.

Relative Risk of CV Events According to Baseline Levels of Homocysteine in Healthy Postmenopausal Women

- In a study of 28,263 women with no history of cardiovascular disease, the correlation between plasma levels of homocysteine and risk of cardiovascular events was not statistically significant.
- 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

SOURCES:
(1) Ridker PM, Hennekens CH, Buring JE, Rifai N. (2000). C-reactive protein and other markers of inflammation in the prediction of cardiovascular disease in women. *New England Journal of Medicine*, 342(12), 836-43.

(2) 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.

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

The Norwegian Vitamin Trial (NORVIT): Homocysteine Lowering Did Not Reduce CV Events in Women with Prior MI

- In this study, which included 978 women, patients were randomized within 7 days of acute myocardial infarction to receive one of four daily treatments: 0.8 mg of folic acid, 0.4 mg of vitamin B12, and 40 mg of vitamin B6; 0.8 mg of folic acid and 0.4 mg of vitamin B12; 40 mg of vitamin B6; or placebo
- Although mean total homocysteine levels were lowered by 27 percent among patients who received folic acid plus vitamin B12, there was no effect on a composite endpoint of recurrent myocardial infarction, stroke, and sudden death attributed to coronary artery disease

SOURCE:
(1) 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.

Psychosocial Stressors in Women with 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).

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."