CARDIOVASCULAR DISEASE PREVENTION IN WOMEN

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Objectives

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

- Heart disease is the leading killer of women
- Cardiovascular disease is BY FAR the biggest killer of women
  - Roughly 401,000 deaths/year from CVD (vs. 386,000 men)
  - 176,255 deaths/year from CAD
  - Vs 39,520 deaths from breast cancer
The Scope of the Problem

One woman dies every minute from cardiovascular disease in the U.S.!

Heart Disease and Stroke Statistics - 2013 Update, AHA
Age-adjusted Death Rates for American Women: U.S. 2006

CHD Stroke Lung Cancer* Breast Cancer*

Per 100,000 Population

* Centers for Disease Control and Prevention, National Center for Health Statistics, Health Data Interactive, 2005-2007.
Annual Number of U.S. Adults Diagnosed with Myocardial Infarction and Fatal CHD by Age and Sex Categories: 1987-2004

Source: Adapted from Rosamond 2008
Number of Cardiovascular Disease Deaths: U.S. Men and Women 1980-2007

Source: Adapted Rosamond 2008 and Roger 2011
Women Receive Fewer Interventions to Prevent and Treat Heart Disease

- Less cholesterol screening
- Fewer lipid-lowering therapies
- Less use of heparin, beta-blockers and aspirin during myocardial infarction
- Less antiplatelet therapy for secondary prevention
- Fewer referrals to cardiac rehabilitation
- Fewer implantable cardioverter-defibrillators compared to men with the same recognized indications

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.

*Source:* Mosca et al. 2010.
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

Source: Mosca et al. 2010.
Cardiovascular Disease (CVD) Risk Stratification: High Risk

- Documented atherosclerotic disease
  - Clinically manifest coronary heart disease
  - Clinically manifest peripheral arterial disease
  - Clinically manifest cerebrovascular disease
  - Abdominal aortic aneurysm
- Diabetes mellitus
- End-stage or chronic kidney disease
- 10-year Framingham cardiovascular disease risk $\geq 10\%$*

*new in 2011

Sources: Mosca 2011, National Heart Lung and Blood Institute
Cardiovascular Disease (CVD)
Risk Stratification:
At Risk

≥ 1 risk factor 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)*
- A history of pregnancy-induced hypertension, gestational diabetes, preeclampsia*  *new in 2011

Source: Mosca 2011
Definition of Metabolic Syndrome in Women

Any 3 of the following:

• Abdominal obesity (waist circumference $\geq 35$ inches)
• High triglycerides $\geq 150$ mg/dL
• Low HDL cholesterol $< 50$ mg/dL
• Elevated BP $\geq 130/85$ mm Hg
• Fasting glucose $\geq 100$ mg/dL

Source: Grundy 2005.
Diagnoses in Obstetrics and Gynecology: Impact on CVD Risk in Selected Studies

Relative Risk of Subsequent CVD

Gestational DM: 1.71
Preeclampsia: 1.74
PCOS*: 1.70


*Polycystic Ovary Syndrome
CVD Risk Stratification: Ideal Cardiovascular Health

- 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 ("Dietary Approaches to Stop Hypertension")
- Ideal patients are rare in most clinical practices, making up less than 5% of women in most studies

Other Lifestyle Interventions

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

Source: Mosca 2011
Relative Risk of Coronary Events for Smokers Compared to Non-Smokers

<table>
<thead>
<tr>
<th>Smoking Status</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never Smoked</td>
<td>1.00</td>
</tr>
<tr>
<td>1-14 Cigarettes per day</td>
<td>3.12</td>
</tr>
<tr>
<td>≥15 Cigarettes per day</td>
<td>5.48</td>
</tr>
</tbody>
</table>

Source: Adapted from Stampfer 2000
Smoking Cessation

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

Five A’s

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

For more information:
www.surgeongeneral.gov/tobacco/#clinician

Source: Fiore 2000
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.

Source: Bader 2009, ACOG 2005
Risk Reduction for CHD Associated with Exercise in Women

Source: Manson 1999
Modifiable Risk Factors:
Sedentary Lifestyle

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

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

Source: Mosca 2011; Surgeon General Call-to-Action 2007
Physical Activity

• 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

Source: Mosca 2011
Obesity Trends*
Among U.S. Adults
(*BMI ≥ 30, or about 30 lbs. overweight for 5’4” person)

Source: CDC
Body Weight and CHD Mortality Among Women

<table>
<thead>
<tr>
<th>Body Mass Index (BMI)</th>
<th>Relative Risk of CHD Mortality Compared to BMI &lt; 19</th>
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</thead>
<tbody>
<tr>
<td>19.0-21.9</td>
<td>1.0</td>
</tr>
<tr>
<td>22.0-24.9</td>
<td>1.0</td>
</tr>
<tr>
<td>25.0-26.9</td>
<td>1.4</td>
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<td>27.0-28.9</td>
<td>3.1</td>
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<tr>
<td>29.0-31.9</td>
<td>4.6</td>
</tr>
<tr>
<td>32</td>
<td>5.8</td>
</tr>
</tbody>
</table>

P for trend < 0.001

Source: Adapted from Manson 1995
Body Weight and CHD Mortality Among Women

Relative Risk of CVD Mortality

Weight Gain Since Age 18

Wt Gain 10-19 kg
Wt Gain ≥20 kg

2.6
7.4

P for trend <0.001

Source: Adapted from Manson 1995
Weight Maintenance/Reduction Goals

- Women should maintain or lose weight through an appropriate balance of physical activity, calorie intake, and formal behavioral programs when indicated to maintain:
  - BMI between 18.5 and 24.9 kg/m²
  - Waist circumference ≤ 35 inches

- Women can obtain a dietary plan customized to their weight and level of physical activity at [www.choosemyplate.gov](http://www.choosemyplate.gov)

Source: Mosca 2011
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: National Heart, Lung, and Blood Institute
Low Risk* Diet is Associated with Lower Risk of Myocardial Infarction in Women

Relative Risk of MI*

*Adjusted for other cardiovascular risk factors

Diet Score by Quintile

* Consumption of vegetables, fruit, whole grains, fish, legumes
  1 = little consumption / 5 = high consumption

P <.05 for quintiles 3-5 compared to 1-2

Source: Akesson 2007
Consistently Encourage Healthy Eating Patterns

- Healthy food selections:
  - Fruits and vegetables (1 serving = 1 cup raw leafy vegetable, 1/2 cup cut-up raw or 1 medium fruit)
  - Whole grains, high fiber (1 serving = 1 slice bread, 1 oz. dry cereal, or 1/2 cup cooked rice, pasta, or cereal (all whole-grain))
  - Fish, especially oily fish, at least twice per week (1 serving = 3.5 oz. cooked)
  - No more than one drink of alcohol per day
  - Less than 1500 mg of sodium per day

- Saturated fats < 7% of calories, < 150 mg cholesterol
- Limit sugar and trans fatty acid intake (main dietary sources are baked goods and fried foods made with partially hydrogenated vegetable oil)
- Pregnant women should be counseled to avoid eating fish with the potential for the highest level of mercury contamination (e.g., shark, swordfish, king mackerel or tilefish)

Source: Mosca 2011
Major Risk Factor Interventions

• Blood Pressure
  – Target BP < 120/80 mm Hg
  – Pharmacotherapy if BP ≥ 140/90 mm Hg, or ≥ 130/80 mm Hg in diabetics or patients with renal disease
    • ACE inhibitors are contraindicated in pregnancy and ought to be used with caution in women who may become pregnant

• Lipids
  – Follow Third Report of the National Cholesterol Education Program (NCEP) Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP) III guidelines

• Diabetes
  – Target HbA1C < 7%, if this can be accomplished without significant hypoglycemia
Hypertension

• Encourage an optimal blood pressure of $< 120/80$ mm Hg through lifestyle approaches
• Pharmacologic therapy is indicated when blood pressure is $\geq 140/90$ mm Hg or an even lower blood pressure in the setting of diabetes or target-organ damage ($\geq 130/80$ mm Hg)
• Thiazide diuretics should be part of the drug regimen for most patients unless contraindicated, or unless compelling indications exist for other agents
• For high risk women, initial treatment should be with a beta-blocker or angiotensin converting enzyme inhibitor or angiotensin receptor blocker

Source: Mosca 2011
Lifestyle Approaches to Reduce Hypertension in Women

- **Maintain ideal body weight**
  - Weight loss of as little as 10 lbs. reduces blood pressure

- **DASH (Dietary Approaches to Stop Hypertension) 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

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

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: Mosca 2011
## Approximate and Cumulative LDL Cholesterol Reduction Achievable By Diet and Weight Loss Modifications

<table>
<thead>
<tr>
<th>Dietary Component</th>
<th>Dietary Change</th>
<th>Approximate LDL Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturated fat</td>
<td>&lt; 7% of calories</td>
<td>8-10%</td>
</tr>
<tr>
<td>Dietary cholesterol*</td>
<td>&lt; 200 mg/day</td>
<td>3-5%</td>
</tr>
<tr>
<td>Weight reduction</td>
<td>Lose 10 lbs.</td>
<td>5-8%</td>
</tr>
<tr>
<td><strong>Other LDL-lowering options</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscous fiber</td>
<td>5-10 g/day</td>
<td>3-5%</td>
</tr>
<tr>
<td>Plant/sterol stanol esters</td>
<td>2 g/day</td>
<td>6-15%</td>
</tr>
<tr>
<td><strong>Cumulative estimate</strong></td>
<td></td>
<td>20-30%</td>
</tr>
</tbody>
</table>

*NOTE: New cholesterol guideline recommends <150mg/day*

Lipids

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

Source: Mosca 2011
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: CDC 2011.
Coronary Artery Disease Mortality and Diabetes in Women

Source: Krolewski 1991
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

Source: Mosca 2011
Preventive Drug Interventions: Aspirin

Other at-risk or healthy women:

- Aspirin therapy can be useful in women ≥ 65 years of age, (81 mg daily or 100 mg every other day) if blood pressure is controlled and benefit for ischemic stroke and MI prevention is likely to outweigh the risk of gastrointestinal bleeding and hemorrhagic stroke and may be reasonable for women < 65 years old for ischemic stroke prevention.

Source: Mosca 2011
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 0.4 mg 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

Source: Mosca 2011
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.

Source: Toh 2010.
American Congress of Obstetricians & Gynecologists (ACOG)

- “Menopausal hormone therapy should not be used for the primary or secondary prevention of CHD at the present.”

- “Hormone therapy use should be limited to the treatment of menopausal symptoms at the lowest effective dosage over the shortest duration possible and continued use should be reevaluated on a periodic basis.”

Source: ACOG 2008
Reproductive Age Women and CHD

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

Source: Rosamond 2008, Pregler 2005
Conclusions

• Gender differences exist in diagnosis, treatment, and prognosis of CHD
• Knowledge of gender differences is essential for appropriate therapy
• Evidence-based guidelines provide a framework for prevention and treatment of cardiovascular disease in women
The Heart Truth Professional Education Campaign Website
www.womenshealth.gov/heart-truth

Million Hearts Campaign
millionhearts.hhs.gov

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THANK YOU!
Cultural Competency: Considering the Diversity of Patients

• In addition to race/geographic/ethnic origin, other facets of diversity should be considered, including:
  – Age, language, culture, literacy, disability, frailty, socioeconomic status, occupational status, and religious affiliation

• The root causes of disparities include variations and lack of understanding of health beliefs, cultural values and preferences, and patients’ inability to communicate symptoms in a language other than their own

• Clinicians also should be familiar with patients’ socioeconomic status, which may make attaining a healthy lifestyle and using medications more difficult

Source: Mosca 2011
Race/Ethnicity and Diabetes

• At elevated risk:
  – Latinas
  – American Indians
  – African Americans
  – Asian Americans
  – Pacific Islanders

Source: American Diabetes Association 2011
Calculate 10-Year Cardiovascular Disease (CVD) Risk

www.framinghamheartstudy.org/risk/gencardio.html#
Hypertension: The average of two seated blood pressure measurements should guide care

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP &gt; 180/110 mm Hg</td>
<td>evaluate and treat immediately or within one week depending on the clinical situation</td>
</tr>
<tr>
<td>BP &gt; 160/100 mm Hg</td>
<td>evaluate and treat or refer within one month</td>
</tr>
<tr>
<td>BP ≥ 140/90 mm Hg</td>
<td>recheck within 2 months, if confirmed, evaluate and treat or refer</td>
</tr>
<tr>
<td>BP ≥ 120/80 mm Hg</td>
<td>counsel regarding lifestyle factors, recheck within one year and monitor</td>
</tr>
</tbody>
</table>

Initial evaluation of the hypertensive patient should include 12-lead EKG, urinalysis, hematocrit, serum glucose, creatinine, calcium, and potassium measurement and a lipid profile.

Cardiovascular Disease Prevention in Women

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