

Women and Heart Disease: An Equal Opportunity Killer

NYSNA Continuing Education

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NYSNA has been granted provider status by the Florida State Board of Nursing as a provider of continuing education in nursing (Provider number 50-1437).

How to Take This Course

Please take a look at the steps below; these will help you to progress through the course material, complete the course examination and receive your certificate of completion.

1. REVIEW THE OBJECTIVES

The objectives provide an overview of the entire course and identify what information will be focused on. Objectives are stated in terms of what you, the learner, will know or be able to do upon successful completion of the course. They let you know what you should expect to learn by taking a particular course and can help focus your study.

2. STUDY EACH SECTION IN ORDER

Keep your learning "programmed" by reviewing the materials in order. This will help you understand the sections that follow.

3. COMPLETE THE COURSE EXAM

After studying the course, click on the "Course Exam" option located on the course navigation toolbar. Answer each question by clicking on the button corresponding to the correct answer. All questions must be answered before the test can be graded; there is only one correct answer per question. You may refer back to the course material by minimizing the course exam window.

4. GRADE THE TEST

Next, click on "Submit Test." You will know immediately whether you passed or failed. If you do not successfully complete the exam on the first attempt, you may take the exam again. If you do not pass the exam on your second attempt, you will need to purchase the course again.

5. FILL OUT THE EVALUATION FORM

Upon passing the course exam you will be prompted to complete a course evaluation. You will have access to the certificate of completion **after you complete the evaluation**. At this point, you should print the certificate and keep it for your records.

Introduction

Heart disease is the #1 killer of American women. **One in four women** dies of heart disease (National Heart, Lung and Blood Institute [NHLBI], 2007). In addition to its fatal consequences, heart disease can lead to disability and a significantly decreased quality of life (NHLBI, 2007).

It has been long thought of as primarily affecting men; however, it is clear that heart disease is an equal opportunity killer. According to the American Heart Association (AHA) (2004), cardiovascular disease claims more women's lives per year than the next seven causes of death combined —over 435,000 lives! That translates to almost 1 death every minute!

Despite the significant threat, for many years many women did not know that heart disease has been the leading cause of death for women (NHLBI, 2007). Women, and surprisingly, their healthcare providers as well, often failed to make the connection between risk factors, such as high blood pressure and high cholesterol, and the chance of developing heart disease (NHLBI, 2007).

The first AHA national survey in 1997 indicated that only 30 percent of women spontaneously listed heart disease as women's leading cause of death. By the year 2000, this increased to just 34 percent. However, in 2006, that figure jumped to 57 percent, a significant improvement (AHA, 2004b). The fact that now one in three die from heart disease, as compared to one in four in 2004, is believed to be related to an increased awareness of the significance of heart disease by women. Women are clearly learning about the threats to their health, but we still have a long way to go.

There are a number of issues that contribute to the continued impact of cardiovascular disease in the United States, regardless of gender: access to care, quality of care, aging of the population, explosion in the prevalence of obesity, diabetes, and hypertension, tobacco consumption and physical inactivity (Bonow, Smaha, Smith, Mensah, & Lenfant, 2002).

Although heart disease impacts both women and men, current statistics reveal significant differences between men and women in survival following a heart attack. For example, 42 percent of women who have heart attacks die within 1 year compared with 24 percent of men (Agency for Healthcare Research and Quality [AHRQ], 2006).

The reasons for this dramatic difference in percentage are not well understood. There are some commonly held beliefs: women tend to get heart disease later in life than do men and they are more likely to have coexisting, chronic conditions. However, research also has shown that women may not be diagnosed or treated as aggressively as men, and their symptoms may be very different from those of men who are having a heart attack. American Heart Association Guidelines, released in early 2004, provide current “best practice” strategies for the treatment of heart disease (Mosca, Appel, Benjamin, Berra et al., 2004). For women who currently have heart disease, these are important treatment guidelines.

However, diseases of the heart need to be reduced through effective prevention strategies. The hallmark of prevention strategy is public education. There are a number of national public education campaigns that have recently been launched in order to educate women and to empower them to learn about their risk for heart disease.

The National Heart, Lung, and Blood Institute (NHLBI), part of the National Institutes of Health, and partner organizations are sponsoring a national campaign called *The Heart Truth*. The campaign's goal is to give women a personal and urgent wake-up call about their risk of heart disease (NHLBI, 2006a).

The campaign is especially aimed at women ages 40 to 60, the time when a woman's risk of heart disease starts to rise. But its messages are also important for all women, since heart disease develops gradually and can start as early as the teen years, yet taking action to prevent and control the risk factors can be helpful at any age. Even those who have heart disease can improve their heart health and quality of life (NHLBI, 2006a).

The American Heart Association has launched Go Red For Women (available at: <http://www.goredforwomen.org/>), a nationwide campaign to raise awareness that heart disease is women's No. 1 killer and stroke is the No. 3 killer of women. The American Heart Association has identified red as a symbol for women and heart disease. Historically, red has also been a color of power. The hope is that women will take their power and invest it in their own health.

Nurses are key to this effort. As the largest discipline among healthcare providers, nurses provide, as a core function of the profession, patient teaching and health education. The "life-style" aspects of the prevention of heart disease, as well as those aspects and/or the management of heart disease are widely recognized as responsive to healthcare teaching. Raising awareness of heart disease in women, teaching and managing prevention strategies, managing treatment strategies, and providing support throughout the process can help to limit the human suffering associated with heart disease. Since nurses work in all aspects of healthcare and see patients throughout the life cycle, nurses are in a unique position to help to identify, counsel, and treat heart disease in women.

This course will present an overview of heart disease in women in order for nurses to better recognize, prevent and manage the number one killer of women. Nurses can have a significant impact on the health of women. And because women often present with unique symptoms, and historically, they have not been treated aggressively for their heart disease, it is important for nurses to be health advocates for their women patients. Additionally, since the vast majority of nurses are female, this information is likely to be useful to nurses for maintaining and managing their own health.

Objectives

Upon completion of this course, the learner will be able to:

- State the risk of heart disease in women.
- Identify risk factors for the development of heart disease.
- Discuss prevention and risk reduction strategies.
- Identify the most recent guidelines for the treatment of heart disease in women.
- Describes the role the registered nurse has in the prevention and treatment of heart disease.

About the Author(s)

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Ms. Beaupre is a board certified psychiatric nurse practitioner in private practice. Ms. Beaupre has worked in a variety of clinical settings, treating a range of psychiatric illness, from the chronically and persistently mentally ill in inpatient settings to treating adult patients in private out-patient settings. Her specialty area of focus is mood disorders in women. She has been an educator in the classroom and in the clinical setting for nursing students at associate's, bachelor's, and master's degree levels. She also has extensive experience in staff development and clinical supervision.

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Statistics Related to Women and Heart Disease

Heart disease is the leading cause of both death and disability worldwide. It has clearly impacted the lives of millions in this country. In addition to the serious health concerns, the economic impact of cardiovascular disease of both women and men on the US healthcare system continues to grow. The cost of heart disease and stroke in the United States is projected to be \$368 billion in 2006, including health care expenditures and lost productivity from death and disability (CDC, 2006).

Cardiovascular disease (CVD), particularly coronary heart disease (CHD) and stroke, remain the leading causes of death of women in America and most developed countries, with 44.6 percent of all female deaths occurring from CVD (AHA, 2004b). One in five females has some form of heart or blood vessel disease (AHA, 2004a).

In 2001, 502,189 people died from heart attacks and other coronary events; 248,184 (49.4 percent) of those victims were women (AHA, 2004a). Nearly two-thirds of deaths from heart attacks in women occur among those who have no history of chest pain (NHLBI, 2001).

Currently there are approximately 8 million American women living with heart disease (NCWHD, 2003). 435,000 American women have heart attacks each year; 83,000 are under age 65 and 9,000 are under age 45. The average age is 70.4 (NCWHD, 2003).

- 6,000,000 of women today have a history of heart attack and/or angina or both (NCWHD, 2003).
- 13% of women age 45 and over have had a heart attack (NCWHD, 2003).
- 43% of deaths in American women, or nearly 500,000, are caused by cardiovascular disease (heart disease and stroke) each year (NCWHD, 2003).
- One in 2 women in the United States dies of heart disease or stroke, while 1 in 30 dies of breast cancer (CDC, 2006).
- CVD ranks first among all disease categories in hospital discharges for women (CDC, 2006).
- 42% of women will die within one year after having a heart attack (AHRQ, 2006).
- Two-thirds of women who have a heart attack fail to make a full recovery (CDC, 2006).
- Once a woman reaches menopause, her risks of heart disease and heart attack jump dramatically. One in 8 women between the ages of 45 and 64 has some form of heart disease, and this increases to 1 in 3 women over 65 (CDC, 2006).

The following fact sheet is also available from the Centers for Disease Control and Prevention (2006): http://www.cdc.gov/dhdsp/library/fs_women_heart.htm.

Facts on Women and Heart Disease

- For this fact sheet, the term "*heart disease*" refers to the broadest category of "*diseases of the heart*" as defined by the International Classification of Diseases and used by CDC's National Center for Health Statistics. This category includes acute rheumatic fever, chronic rheumatic heart disease, hypertensive heart disease, coronary heart disease, pulmonary heart disease, congestive heart failure, and any other heart condition or disease.
- Although heart disease is sometimes thought of as a "man's disease," it is the leading cause of death for both women and men in the United States and women account for 51% of the total heart disease deaths.
- Of the 1,244,123 deaths among women in 2002, 28.6% were due to diseases of the heart.

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- Awareness of heart disease as the number one killer of women:
 - Good news: According to surveys by the American Heart Association, the percentage of women who spontaneously identified heart disease as the number one killer of women increased from 30% in 1997 to 46% in 2003.
 - Bad news: Only 13% of the women in the 2003 survey perceived heart disease as their greatest health problem. While this is an increase from the 7% level in 1997, it still reflects an attitude that heart disease is "not my problem."
- Heart disease is often perceived as an "older woman's disease," and it is the leading cause of death among women aged 65 years and older. However, heart disease is the 3rd leading cause of death among women aged 25–44 years and the 2nd leading cause of death among women aged 45–64 years.
- In 2002, age-adjusted death rates for heart disease were higher among black women (169.7 per 100,000) than among white women (131.2 per 100,000).

There is a range of risk for heart disease depending on family and personal health history and the treatment recommendations from a physician will depend on a woman's level of risk. Regardless of the risk level, these lifestyle modifications are recommended for all women:

- Cigarette smoking cessation
- 30 minutes physical activity most days
- Heart-healthy diet
- Weight maintenance/reduction
- Evaluation and treatment of depression

CDC Activities to Reduce the Burden of Heart Disease Among Women

- CDC co-sponsored two international conferences on women and heart disease and stroke in 2000 and 2005. The Victoria Declaration on Women, Heart Disease, and Stroke, 2000, resulted from the first conference and is available on [Canada's Heart Health Initiative Web site](#).*
- CDC supports National Wear Red for Women day, which is conducted to raise awareness of the importance of heart health among women.
- CDC participates in the development of guidelines for cardiovascular disease prevention in women. The most recent guidelines were published in the journal *Circulation* 2004;109:672–673.
- On-going surveillance of heart disease and its risk factors by gender.

Maps of Heart Disease and Stroke Mortality Among Women and Men

The interactive maps present heart disease and stroke mortality rates, county-by-county, for the state, racial/ethnic group, and gender of your choice. These maps provide valuable information for health professionals and concerned citizens at the local, state, and national levels to identify the communities of women and men with the greatest burden of heart disease and to design heart disease prevention programs and policies tailored to the needs of those communities. These maps were developed through a collaboration between CDC and researchers at West Virginia University and the University of South Florida, and are part of three documents entitled *The Atlas of Stroke Mortality: Racial, Ethnic, and Geographic Disparities in the United States*;

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Women and Heart Disease: An Atlas of Racial and Ethnic Disparities in Mortality; and Men and Heart Disease: An Atlas of Racial and Ethnic Disparities in Mortality.
<http://www.cdc.gov/DHDSP/library/maps/statemaps.htm>.

For More Information

For more information on women and heart disease, visit the following Web sites:

- [CDC's Cardiovascular Health Program](#)
- [A Public Health Action Plan to Prevent Heart Disease and Stroke](#)
A Public Health Action Plan to Prevent Heart Disease and Stroke is a groundbreaking collaboration that will help to guide the nation's heart disease and stroke prevention efforts over the next decades. The *Action Plan* was developed by public and private partners who are committed to preventing disease rather than treating its consequences and to transforming public health agencies and their partners into effective agents of change. A national forum of experts, representing some 50 national and international organizations, serves as the vehicle for implementing the *Action Plan*. The three lead partners are the American Heart Association/American Stroke Association, the Association of State and Territorial Health Officials, and CDC, which provides core support for convening the national forum and implementing the *Action Plan*.
- [American Heart Association \(AHA\)*](#)
 - Go Red for Women campaign
 - AHA Guidelines: Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women
- [Association of Black Cardiologists*](#)
 - The African American Woman's Guide to a Healthy Heart
 - Heart Health for the Generations: A Guide for African-American Women featuring Maya Angelou
- [National Heart, Lung, and Blood Institute](#)
 - [The Heart Truth: A National Awareness Campaign for Women about Heart Disease](#)
 - [The Healthy Heart Handbook for Women—2003 Edition](#) (PDF 679K)
 - [Postmenopausal Hormone Therapy](#) — Estrogen alone or combined with progesterone should not be initiated nor continued to prevent cardiovascular disease in post menopausal women.

Risk Factors/Multiple Risk Factors

Research has identified risk factors associated with heart disease (as well as other chronic illnesses). These include smoking, high blood pressure, high cholesterol, lack of exercise, and obesity or overweight. Additionally, a recent study conducted by the Mayo Clinic, identified that delaying treatment beyond the one to two hours of onset of symptoms is another risk factor that correlates with poorer outcomes (2007). While individual risk factors have been researched, the effect of multiple risk factors simultaneously is not determined.

- Women who smoke risk having a heart attack 19 years earlier than non-smoking women (NCWHD, 2003).
- Women with diabetes are two to three times more likely to have heart attacks (NCWHD, 2003).
- High blood pressure is more common in women taking oral contraceptives, especially in obese women (NCWHD, 2003).

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- 39% of Caucasian women, 57% of African American women, 57% of Hispanic women, and 49% Asian/Pacific Islander women are sedentary and get no leisure time physical activity (NCWHD, 2003).
- 23% of Caucasian women, 38% of African American women, and 36% Mexican American women are obese (NCWHD, 2003).

Minority Women

- CVD is a particularly important problem among minority women. The death rate due to CVD is 69% higher in African American women than in Caucasian women (AHA, 2004b).
- Heart disease is the number one leading cause of death in the Hispanic population; Hispanic women have higher CVD rates than do Hispanic men (AHA, 2004b).
- Hispanic women have high prevalence rates for risk factors for heart disease than do Caucasian women: hypertension, overweight and obesity, physical inactivity and diabetes. Hispanic women do, however, have lower rates of smoking cigarettes than do Caucasian women (NHLBI, 2006a).

Stroke

- 100,361 women died of stroke in 2001 (61.4% of total stroke deaths) (AHA, 2004a).
- Of the approximately 4 million stroke survivors alive today, 52% are women (AHA, 2004b).
- Stroke is a leading cause of serious, long-term disability; at least 31% of stroke survivors require substantial care and assistance (AHA, 2004b).

CVD compared to other illnesses

- Breast cancer claimed the lives of 40,539 females in 2004. Lung cancer claimed another 67,838. All forms of cancer combined killed 265,022 women (NHLBI, 2007).
- It's estimated that one in two women will eventually die of heart disease or stroke, compared with one in 30 who will eventually die of breast cancer (CDC, 2006).

The leading causes of death for American women in the year 2004 (NHLBI, 2007):

Heart Disease	332,313
Cancer (all types)	265,022
Lung	67,838
Breast	40,539
Colorectal	26,762
Pancreatic	15,815
Ovarian	14,593
Uterine	6,906
Cervical	3,804
Others	88,765
Stroke	91,487
Chronic obstructive pulmonary disease	64,409
Pneumonia/influenza	33,902

Differences between Women and Men

- In 2001 in the United States, all cardiovascular diseases claimed the lives of 498,863 women. In the same year 432,245 men died from these diseases (AHA, 2004a).
- 42% of women compared with 24% of men will die within one year after a heart attack (AHRQ, 2006).
- 31% of women versus 33% of men age 65 and over discharged from home healthcare agencies had a primary diagnosis of cardiovascular disease (AHA, 2004b).
- During the first six years after a recognized heart attack, the rate of having a second attack is 35% for women. For men it's 18% (AHA, 2004a).
- 38% of women and 25% of men will die within one year of a first recognized heart attack (NCWHD, 2003).
- 35% of women and 18% of men heart attack survivors will have another heart attack within six years (NCWHD, 2003).
- 46% of women and 22% of men heart attack survivors will be disabled with heart failure within six years (NCWHD, 2003).
- Women are almost twice as likely as men to die after bypass surgery (NCWHD, 2003).
- Women are less likely than men to receive beta-blockers, ACE inhibitors or even aspirin after a heart attack (NCWHD, 2003).
- More women than men die of heart disease each year, yet women receive only (NCWHD, 2003):
 - 33% of angioplasties, stents and bypass surgeries
 - 28% of implantable defibrillators and
 - 36% of open-heart surgeries
- Women comprise only 25% of participants in all heart-related research studies (NCWHD, 2003).

Geographical Differences

A 2005 survey below, describes the prevalence of Myocardial infarction and coronary heart disease by state.

TABLE 2. Percentage* of respondents aged ≥18 years who reported a history of myocardial infarction (MI) or angina/coronary heart disease (CHD), by state/area — Behavioral Risk Factor Surveillance System, United States, 2005

State/Area	No. of respondents	MI (%) [†]	95% CI [‡]	Angina/CHD (%) [¶]	95% CI	MI or angina/CHD (%) ^{**}	95% CI
Alabama	3,197	5.1	4.3–5.9	4.5	3.8–5.2	7.4	6.6–8.4
Alaska	2,813	4.0	2.9–5.5	4.2	3.0–5.8	5.5	4.3–7.2
Arizona	4,710	4.6	3.6–5.7	4.8	4.0–5.7	7.0	5.9–8.3
Arkansas	5,280	4.6	4.1–5.2	4.6	4.1–5.2	6.7	6.1–7.4
California	6,134	3.3	2.8–3.9	4.3	3.7–5.0	6.0	5.3–6.8
Colorado	5,979	3.3	2.8–3.7	2.8	2.4–3.3	4.8	4.3–5.4
Connecticut	5,254	3.1	2.6–3.6	4.0	3.5–4.6	5.4	4.8–6.0
Delaware	4,192	4.2	3.6–4.9	4.7	4.1–5.5	6.9	6.1–7.8
District of Columbia	3,743	3.0	2.4–3.7	3.2	2.6–4.0	4.8	4.0–5.7
Florida	8,190	4.5	4.0–5.1	5.2	4.6–5.9	7.4	6.7–8.2
Georgia	6,064	4.1	3.6–4.7	3.9	3.4–4.6	6.1	5.5–6.9
Hawaii	6,416	3.4	2.9–4.0	3.2	2.7–3.8	4.9	4.3–5.6
Idaho	5,734	4.2	3.7–4.8	4.9	4.1–5.9	6.9	6.1–8.0
Illinois	5,077	3.9	3.4–4.6	3.6	3.1–4.2	6.0	5.4–6.8
Indiana	5,635	4.9	4.4–5.5	4.7	4.2–5.3	6.8	6.2–7.5
Iowa	5,051	4.0	3.5–4.5	4.1	3.6–4.7	5.9	5.3–6.6
Kansas	8,626	3.9	3.5–4.3	4.4	4.0–4.9	6.3	5.8–6.8
Kentucky	6,628	6.0	5.4–6.8	5.4	4.8–6.1	8.8	8.0–9.6
Louisiana	2,936	4.6	3.8–5.5	5.2	4.4–6.1	7.9	6.9–9.0
Maine	3,960	4.1	3.5–4.8	4.0	3.5–4.7	6.1	5.4–6.9
Maryland	8,632	3.7	3.2–4.1	3.7	3.3–4.2	5.6	5.1–6.2
Massachusetts	8,906	4.0	3.5–4.4	3.8	3.4–4.3	5.7	5.2–6.3
Michigan	12,136	4.5	4.2–4.9	4.4	4.0–4.7	6.9	6.4–7.3
Minnesota	2,829	3.2	2.7–3.9	3.3	2.7–3.9	5.0	4.3–5.7
Mississippi	4,439	5.1	4.5–5.9	5.1	4.5–5.8	8.0	7.2–8.8
Missouri	5,164	4.9	4.3–5.5	4.5	3.9–5.1	7.3	6.5–8.1
Montana	4,983	3.4	2.9–4.0	3.2	2.7–3.8	5.1	4.5–5.7
Nebraska	8,332	3.7	3.3–4.1	3.4	3.0–3.8	5.3	4.9–5.8
Nevada	3,161	4.8	3.9–6.0	4.2	3.4–5.2	6.5	5.5–7.7
New Hampshire	6,038	3.7	3.2–4.2	4.4	3.9–4.9	6.2	5.6–6.9
New Jersey	13,663	3.6	3.3–4.0	4.2	3.9–4.7	6.0	5.5–6.5
New Mexico	5,585	3.8	3.3–4.3	3.3	2.9–3.8	5.2	4.7–5.8
New York	7,796	3.3	2.9–3.8	4.2	3.7–4.7	5.8	5.3–6.4
North Carolina	17,261	4.2	3.9–4.6	4.2	3.9–4.5	6.6	6.2–7.0
North Dakota	4,010	3.9	3.4–4.5	3.8	3.3–4.4	5.8	5.2–6.6
Ohio	7,408	4.2	3.6–4.9	4.2	3.6–4.8	6.2	5.5–6.9
Oklahoma	13,707	5.0	4.5–5.6	4.7	4.2–5.2	7.5	6.9–8.1
Oregon	12,015	3.5	3.2–3.8	3.6	3.3–4.0	5.5	5.1–5.9
Pennsylvania	13,378	4.0	3.6–4.5	4.5	4.0–4.9	6.2	5.7–6.8
Rhode Island	3,976	3.3	2.8–3.9	4.0	3.4–4.6	5.6	4.9–6.3
South Carolina	8,440	4.4	3.9–4.8	4.0	3.6–4.4	6.5	6.0–7.1
South Dakota	6,915	4.0	3.6–4.5	4.0	3.6–4.4	6.1	5.6–6.6
Tennessee	4,749	4.9	4.3–5.6	4.5	3.9–5.3	7.6	6.8–8.5
Texas	6,512	4.2	3.7–4.8	4.8	4.1–5.5	7.0	6.3–7.8
Utah	5,137	3.2	2.7–3.8	3.2	2.7–3.8	5.0	4.4–5.7
Vermont	6,763	3.7	3.3–4.2	4.2	3.8–4.7	6.0	5.5–6.6
Virginia	5,493	4.1	3.5–4.7	4.6	4.0–5.3	6.5	5.8–7.3
Washington	23,302	3.5	3.2–3.8	3.7	3.4–4.0	5.5	5.2–5.9
West Virginia	3,553	6.1	5.4–6.9	7.3	6.5–8.2	10.4	9.4–11.4
Wisconsin	4,900	3.3	2.8–3.9	3.8	3.2–4.5	5.3	4.7–6.0
Wyoming	5,009	3.6	3.2–4.2	3.6	3.1–4.1	5.3	4.8–6.0
Puerto Rico	3,789	4.0	3.3–4.8	8.5	7.5–9.5	10.2	9.2–11.3
U.S. Virgin Islands	2,422	2.1	1.5–2.9	2.2	1.6–3.0	3.5	2.7–4.5
Total	356,112	4.0	3.9–4.1	4.4	4.3–4.5	6.5	6.3–6.6

* Weighted percentages are age adjusted to the 2000 U.S. standard population of adults.
[†] Percentage of respondents who reported a history of MI.
[‡] Confidence interval.
[¶] Percentage of respondents who reported a history of angina/CHD.
^{**} Percentage of respondents who reported a history of MI, angina/CHD, or both.

Source: CDC, 2005 (available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5606a2.htm#tab2>)

Myths

- Misperceptions still exist that CVD is not a real problem for women (AHA, 2004b). This myth continues to be believed by women and some healthcare providers.

What is Heart Disease?

Although often referred to simply as heart disease, CVD encompasses a number of different specific disorders. Among them are coronary heart disease (CHD), heart failure-including congestive heart failure (CHF), acute myocardial infarction (AMI), ischemic heart disease, angina pectoris, stroke, hypertension, rheumatic heart disease, etc. (NHLBI, 2003a).

Coronary heart disease is the leading form of heart disease. It is a disorder of the coronary arteries wherein they become blocked, preventing oxygen and nutrients from getting to the heart (NHLBI, 2003a). This narrowing of the coronary arteries can lead to angina and AMI.

Congestive heart failure is a life-threatening condition in which the heart fails to pump enough blood to supply the body's needs. Congestive heart failure occurs when excess fluid starts to leak into the lungs, causing fatigue, weakness, and dyspnea (NHLBI, 2003a).

Risk Factors for Heart Disease in Women

Even if a woman does not currently have a diagnosed heart disease, there is increasing evidence that with one or more risk factors, the possibility of heart disease becomes more and more likely. Risk factors can also increase the chances that an existing disease will get worse. Some risk factors are outside of our control, such as age and family history; some risk factors are those that we can do something about, such as cigarette smoking, high blood pressure, high blood cholesterol, overweight, physical inactivity, and diabetes (NHLBI, 2003a).

Age

For women, age becomes a risk factor at 55 (NHLBI, 2003a). After menopause, women are more apt to get heart disease, in part because their body's production of estrogen drops. Women who have gone through early menopause, either naturally or because they have had a hysterectomy, are twice as likely to develop heart disease as women of the same age who have not yet gone through menopause. Another reason for the increasing risk is that middle age is a time when women tend to develop other risk factors for heart disease (NHLBI, 2003a).

Family History

An early family history of early heart disease is a risk factor (NHLBI, 2003a). If one's father or brother had a heart attack before age 55, or if one's mother or sister had one before age 65, there is a greater risk for heart disease for the individual (NHLBI, 2003a).

Hypertension

The relationship between blood pressure (BP) and the risk of CVD is continuous, consistent and independent of other risk factors (NHLBI, 2003b). The higher the BP, the greater the risk is for heart attack, heart failure, stroke, and kidney disease.

- A higher percentage of men than women have hypertension until age 55. From ages 55-74 the percentage of women is somewhat higher.
- The age-adjusted prevalence of hypertension among US adults age 20 and older is 29.5 percent for non-Hispanic Caucasian women, 44.7 percent for African American (only) women, and 29.9 percent for Mexican women.
- High blood pressure is 2-3 times more common in women taking oral contraceptives, especially in obese and older women, than in women not taking them.

In 2003, the 7th Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure identified guidelines for prevention and management of hypertension. Among the new information in this guideline was a new categorization of hypertension (see Table 2).

In persons age 50 and older, systolic BP greater than 140 mmHg is a much more important risk factor for CVD than is diastolic blood pressure (NHLBI, 2003b). The risk of CVD beginning at 115/75mmHg doubles with each increment 20/10 mmHg; individuals who are normotensive at age 55 have a 90% lifetime risk of developing hypertension (NHLBI, 2003b). Individuals with a systolic blood pressure of 120-139 mmHg or a diastolic blood pressure of 80-89 mm/Hg should be considered pre-hypertensive and require lifestyle modifications that are health promoting in order to prevent CVD (NHLBI, 2003b).

Classification	Systolic BP mmHg	Diastolic BP mmHg
Normal	< 120	< 80
Prehypertension	120-139	80-89
Stage 1 Hypertension	140-159	90-99
Stage 2 Hypertension	≥ 160	≥100

The category of prehypertension is important for healthcare professionals to be aware of; it signals the need for health education and risk reduction strategies to help prevent hypertension (NHLBI, 2003b).

Healthy People 2010 has a target goal of 50% control rate for hypertension; and although control rates have improved over the years, currently about 30% of those with hypertension are unaware that they have it (NHLBI, 2003b).

Cigarette Smoke

According to the NHLBI (2003a), cigarette smoking has been described as “the most important individual health risk in this country.” Women who smoke are two to six times more likely to suffer a heart attack than nonsmoking women, and the risk increases with the number of cigarettes smoked each day. Among women age 18 and older, 22,600,000 (20.7 percent) smoke; 21.7 percent of Caucasian women, 18.0 percent African-American women, 12.5 percent of Hispanic / Latina women, 6.9 percent of Asian (only) women, and 36.9 percent of American Indian / Alaska Native (only) women smoke.

Smoking also increases the risk of stroke. In addition to heart disease and stroke, cigarette smoking greatly increases the chances that a woman will develop lung cancer. Currently, the lung cancer death rate for women is higher than the death rate for breast cancer. Cigarette smoking is also linked with many other types of cancer, including cancers of the mouth, urinary tract, kidney, and cervix. Smoking also causes most cases of chronic obstructive lung disease, which includes bronchitis and emphysema. One’s “secondhand smoke” can also cause numerous health problems in those individuals with whom you live or work.

There is simply no safe way to smoke. Although low-tar and low nicotine cigarettes may reduce the lung cancer risk somewhat, they do not lessen the risks of heart disease or other smoking related diseases. The only safe and healthful course is not to smoke at all.

Data from the 1999 NHIS study of the NCHS shows that women smokers who use oral contraceptives are more likely to have a heart attack and much more likely to have a stroke than are nonsmokers who use birth control pills.

Serum Cholesterol

Cholesterol is a lipid, present in all cell membranes. It travels through the blood in distinct particles containing both lipids and proteins (lipoproteins). There are 3 major categories of lipoproteins: low density lipoproteins (LDL), high density lipoproteins (HDL), and very low density lipoproteins (VLDL) (NHLBI, 2004). LDL cholesterol, often called “bad” cholesterol, makes up 60-70 % of the total serum cholesterol and is the major atherogenic lipoprotein; it is the primary focus of cholesterol reducing medications. Therapy which reduces the LDL has been correlated in clinical trials with reducing the risk of CVD (NHLBI, 2004). HDL cholesterol; sometimes known as “good” cholesterol, makes up approximately 20-30% of the total serum cholesterol. HDL cholesterol levels are inversely correlated with risk for CVD (NHLBI, 2004). The VLDL cholesterol is triglyceride-rich; it makes up 10-15% of the total serum cholesterol level.

Although young women tend to have lower cholesterol levels than young men, between the ages of 45 and 55, women's levels begin to rise higher than men's. After age 55, this "cholesterol gap" between women and men becomes still wider. Although at older ages, women's overall risk of heart disease continues to be somewhat lower than that of men, the higher a woman's blood cholesterol level, the greater her chances of developing heart disease.

Table 3. Blood Cholesterol Levels and Heart Disease Risk	
Total Cholesterol Level	Category
Less than 200 mg/dL	Desirable
200-239 mg/dL	Borderline high
240 mg/dL and above	High
LDL Cholesterol Level	Category
Less than 100 mg/dL	Optimal
100-129 mg/dL	Near optimal/above optimal
130-159 mg/dL	Borderline high
160-189 mg/dL	High
190 mg/dL and above	Very high
HDL Cholesterol Level	
Less than 40 mg/dL is a major risk factor for heart disease.	
Level of 60 mg/dL or higher is protective.	

Triglycerides are another type of fat found in the blood and in food. Triglycerides are produced in the liver. When you drink alcohol or take in excess calories, your liver produces more triglycerides. Recent research indicates that triglyceride levels that are borderline high (150-199 mg/dL) or high (200 mg/dL or more) increase your risk of heart disease. To reduce blood triglyceride levels, doctors recommend a low-saturated fat, low cholesterol diet that also limits carbohydrates. It is also important to control your weight, get more physical activity, and avoid smoking and alcohol. Sometimes, medication is needed.

In general, the higher your LDL level and the more other risk factors you have, the greater your chances of developing heart disease or having a heart attack. The higher your risk, the lower your LDL "goal" level will be.

About 55,500,000 adult women have blood cholesterol levels of 200 mg/dL or higher. Among women ages 20 and older, this includes 53.6 percent of white (only) women, 46.4 percent of black and African-American (only) women and 44.7 percent of Mexican women.

About 19.9 percent of Caucasian (only) women, 17.7 percent of black or African-American (only) women and 14 percent of Mexican women ages 20 and older have cholesterol levels of 240 mg/dL or higher.

Physical inactivity

Physical inactivity raises your risk of heart disease; it increases the chances of developing heart-related problems even if you have no other risk factors. It also increases the likelihood that you will develop other heart disease risk factors, such as high blood pressure, diabetes, and overweight/obesity. Yet most women aren't getting enough physical activity.

According to *The Surgeon General's Report on Physical Activity and Health*, 60 percent of women in the United States don't get the recommended amount of physical activity (NHLBI, 2003a). More than 25 percent of women are not active at all during their free time. Studies show that among adults age 18 and older, 36.2 percent of non-Hispanic white women, 55.2 percent of non-Hispanic

black women, 57.4 percent of Hispanic women and 45.5 percent of Asian/Pacific Islander women have a sedentary lifestyle (no leisure physical activity) (NHLBI, 2003a). In addition to raising the risk of heart disease, lack of physical activity leads to more healthcare visits, hospitalizations, and use of medicines for a variety of illnesses.

For older women, physical inactivity also increases the risk of osteoporosis, which in turn may increase the risk of bone fracture. This is worrisome since women tend to become less physically active as they get older. Fortunately, research shows that as little as 30 minutes of moderate activity on most, and preferably all, days of the week helps to protect heart health. This level of activity can reduce your risk of heart disease as well as lower your chances of having a stroke, colon cancer, high blood pressure, diabetes, and other medical problems. Examples of moderate activity are taking a brisk walk, raking leaves, housecleaning, or gardening. If you prefer, you can divide your 30-minute activity into shorter periods of at least 10 minutes each.

Overweight and Obesity

The national rate of obesity continues to climb. According to the National Heart, Lung, and Blood Institute (NHLBI), part of the National Institutes of Health (2006), there are an estimated 97 million Americans who are overweight or obese. This number has risen since 1960; currently 54.9 percent of adults age 20 or older are overweight or obese. Almost 62 percent of all American women age 20 and older are overweight—about 33 percent of them are obese. The more overweight a woman is the higher her risk is for heart disease.

According to the NHLBI (2002), 57.3 percent of white (only) women are overweight and 30.1 percent are obese; 77.3 percent of black or African-American women are overweight and 49.7 percent are obese; and 71.9 percent of Mexican women are overweight and 39.7 percent are obese.

Overweight is defined as a body mass index (BMI) of 25 to 29.9 kg/m² and obesity as a BMI of ≥ 30 kg/m². However, overweight and obesity are not mutually exclusive, since obese persons are also overweight (NHLBI, 2006b). Obesity is a complex multifactorial chronic disease that develops from an interaction of genotype and the environment. Current understanding of how and why obesity develops is incomplete, but involves the integration of social, behavioral, cultural, physiological, metabolic and genetic factors (NHLBI, 2006b).

Being overweight also increases the risks for stroke, congestive heart failure, gallbladder disease, arthritis, and pulmonary problems, as well as breast, colon, and other cancers. Being overweight is an independent risk factor for the development of heart disease even if there are no other risk factors. Being overweight also appears to contribute to heart disease by increasing the chances of developing other major risk factors, such as diabetes, high blood pressure, and high blood cholesterol.

Diabetes mellitus

Diabetes is a major risk factor for heart disease and stroke. About 65 percent of people who have diabetes die of some type of cardiovascular disease. Diabetic women are at especially high risk for dying of heart disease and stroke. Today, about 9 million women in the United States have diabetes including an estimated 3 million women have diagnosed diabetes. An estimated 5.8 million women have impaired fasting glucose. The age-adjusted prevalence of diagnosed diabetes in adults age 20 and older is 4.7 percent for non-Hispanic white women, 9.5 percent for non-Hispanic black women and 11.4 percent for Mexican-American women.

Type 2 diabetes is the form of the disease that most commonly develops in adulthood. In type 2 diabetes, while the pancreas makes insulin, the body cannot use it properly and gradually loses

the ability to produce it. Type 2 diabetes is a serious disease. In addition to increasing the risk for heart disease, it is the leading cause of kidney failure, blindness, and lower limb amputation in adults. Diabetes can also lead to neuropathies and difficulties in fighting infection.

The risk of type 2 diabetes rises after the age of 45. One is more likely to develop this disease if there are existing conditions such as being overweight, especially if the extra weight is in the abdominal area. Other risk factors include physical inactivity and a family history of diabetes. Type 2 diabetes also is more common among Native Americans, Hispanic Americans, African Americans, Asian Americans, and Pacific Islanders. Women who have had gestational diabetes or gave birth to a baby weighing more than 9 pounds are at increased risk for type 2 diabetes later in life.

Symptoms of diabetes may include fatigue, nausea, frequent urination, unusual thirst, weight loss, blurred vision, frequent infections, and slow healing of sores. However, type 2 diabetes develops gradually and often there are no symptoms. Once diabetes is diagnosed, complications of the disease are already present. Controlling your blood glucose levels is imperative and can help to prevent complications. Because diabetes is so strongly linked with heart disease, managing diabetes must include keeping certain factors under control. Recommended levels of blood pressure and blood cholesterol control are lower for people with diabetes than for the general population.

The American Diabetes Association Clinical Practice Recommendations for 2004 reflect new changes in what is considered normal blood glucose levels and the diagnostic criteria for diabetes (ADA, 2004). Table 4 provides these recommendations (ADA, 2004):

Table 4. ADA Clinical Practice Recommendations for Blood Glucose Levels			
	Random	Fasting	2 Hours Post Glucose Load on Oral Glucose Tolerance Test (OGTT)
Normal Blood Glucose level		< 100 mg/dl	< 140 mg/dl
Diabetes Mellitus (on two occasions)	≥200 mg/dl (with symptoms)	≥126 mg/dl	≥200 mg/dl on OGT
Impaired Glucose Tolerance			> 140 and < 200 mg/dl on OGT
Impaired Fasting Glucose		≥100 and < 126 mg/dl	

Even if one does not have type 2 Diabetes, altered serum glucose levels can also be a risk factor for CVD. The insulin resistance syndrome, previously called Syndrome X, then the Dysmetabolic Syndrome, and now the Metabolic Syndrome, encompasses several conditions: obesity, hyperglycemia, dyslipidemia, hypertension, and hypercoagulability. According to NCEP III, the formal criteria for the diagnosis of the Metabolic Syndrome are three of the following (NIH, 2001):

- Fasting blood glucose ≥110 mg/dl
- Waist circumference > 40" (men), > 35" (women)
- BP ≥130/85 mm/Hg
- Triglycerides ≥150 mg/dl
- HDL < 40 mm/dl (male), < 50 mm/dl (female)

Chronic kidney disease

The American Heart Association Councils on Kidney in Cardiovascular Disease, High Blood Pressure Research, Clinical Cardiology, and Epidemiology and Prevention (Sarnak et al., 2003) issued a statement identifying chronic kidney disease (CKD) as another major risk factor for cardiovascular disease. The number of individuals with kidney failure treated by dialysis and

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transplantation exceeded 320,000 in 1998 and is expected to surpass 650,000 by 2010. In 1998, the National Kidney Foundation (NKF) Task Force on Cardiovascular Disease in Chronic Renal Disease issued a report emphasizing the high risk of CVD in CKD. This report showed that there was a high prevalence of CVD in CKD and that mortality due to CVD was 10 to 30 times higher in dialysis patients than in the general population

Potential Risk Factors

The NHLBI (2003a) reports several potential risk factors that are emerging and are being investigated as to their link to heart disease in women. These include:

- High levels of homocysteine – High levels of this amino acid may irritate and damage arteries which may contribute to clot formation and a reduced flexibility of the vessels. Women’s levels of homocysteine increase after menopause. The addition of folic acid, B6 and B12 in the diet may help to lower homocysteine levels.
- Chlamydia pneumoniae – This is a common cause of respiratory infections. It may be related to inflammation and destruction of blood vessel walls; antibiotics may be effective.
- Lp(a) protein. This is a lipoprotein that may cause too much blood clotting. It also may worsen inflammation. Niacin, a lipid-lowering drug, may help to lower Lp(a) protein levels.
- C-reactive protein (CRP). High levels of C-reactive protein indicate inflammation in artery walls. A simple blood test can measure the levels of CRP in the blood. Aspirin and statin drugs may help to reduce high CRP levels.

All of these risk factors must all be taken into consideration. In order to protect the heart, women need to make changes that address each risk factor she has. These changes can be made gradually, one at a time (NHLBI, 2003a).

Risk Level	Clinical Examples
High	<ul style="list-style-type: none"> • Established Coronary Heart Disease • Cerebrovascular Disease, particularly Carotid Artery Disease • Peripheral Arterial Disease • Abdominal Aortic Aneurysm • Diabetes Mellitus • Chronic Kidney Disease
Intermediate	<ul style="list-style-type: none"> • Sub-clinical CVD (ex-coronary calcification) • Metabolic Syndrome • Multiple Risk Factors • Markedly Elevated Levels of a Single Risk Factor • First Degree Relative with Early Onset (males <55; females <65) Atherosclerotic CVD
Lower	<ul style="list-style-type: none"> • May include women with multiple risk factors, metabolic syndrome, or 1 or no risk factors
Optimal	<ul style="list-style-type: none"> • Optimal levels of risk factors and heart-healthy lifestyle

Co-Morbidity

As mentioned previously, there are multiple comorbid conditions associated with CVD: hypertension, diabetes, hypercholesterolemia, obesity, etc. In addition, researchers have begun to look at other conditions.

Depression

According to the National Institute of Mental Health (2005), nearly twice as many women (12.0 percent) as men (6.6 percent) suffer from major depressive disorder each year. Women have depression at a rate of twice that of men.

The Women's Health Initiative Observational Study (Wassertheil-Smoller et al., 2004) followed up 93,676 women for an average of 4.1 years, with depression being measured at baseline. These researchers reported that among women with no history of cardiovascular disease, depression was an independent predictor of cardiovascular disease death and all-cause mortality after adjustment for age, race, education, income, diabetes, hypertension, smoking, high cholesterol level requiring medication, body mass index, and physical activity. Taking antidepressant medications did not alter the depression-associated risk for heart disease (Wassertheil-Smoller et al., 2004).

A large proportion of older women report levels of depressive symptoms that are significantly related to increased risk of CVD death and all-cause mortality, even after controlling for established CVD risk factors (Wassertheil-Smoller et al., 2004). Whether early recognition and treatment of subclinical depression will lower CVD risk remains to be determined in clinical trials.

Why is Heart Disease Such a Problem for Women?

For many years it was thought that cardiac disease was an illness that belonged exclusively in the realm of a “man’s” disease. In the era of Ozzie and Harriet, only men had the pressures associated with life in the “real world.” It was thought that the stress of earning a living in the business, “dog-eat-dog” world was a major risk factor in heart attacks. So for many years, it was thought that women, who were then mostly homemakers, did not have the same risk for heart disease and heart attack that men had.

The NHLBI (2001a) reports that women wait longer than do men before they go to the emergency department when symptoms appear. One explanation for this is that women tend to be the family caretakers; their focus is on the care of others, so women often neglect or minimize their own health and disease symptoms.

Although the situation is improving, healthcare providers continue to underdiagnose, misdiagnose and therefore, mis-“treat” women with health disease. According to the Agency for Healthcare Research and Quality (AHRQ) (2006), emergency room doctors miss diagnosing about two percent of women and minority patients with heart attacks or unstable angina because they do not have chest pain or other symptoms typically associated with a heart attack. Often, the most commonly reported symptoms was shortness of breath (symptoms of heart attack in women will be covered in the next section of this course).

Even when heart disease is identified, women often do not receive aggressive treatment. The American Heart Association (2007) reports that research suggests that fewer women than men with suspected acute heart attack symptoms are referred for noninvasive tests, and fewer women than men who test positive for heart disease are recommended for further testing and treatment. Because of the high fatality rate associated with first heart attacks in women, it is important to evaluate women with suspected heart attacks promptly, carefully and completely. It is even more important to emphasize prevention through reduction of risks.

Clearly, healthcare providers have contributed to the issue of heart disease in women. The National Coalition for Women with Heart Disease (www.womenheart.org) uses, as part of its logo: “Early Detection, Accurate Diagnosis, Proper Treatment.” These are truly some of the most important aspects of providing healthcare to women in relation to heart disease.

Symptoms of Acute Myocardial Infarction in Women

Typically symptoms of acute myocardial infarction (AMI) have generally been reported as:

- Chest discomfort or uncomfortable pressure, fullness, squeezing or pain in the center of the chest that lasts longer than a few minutes, or comes and goes.
- Spreading pain to one or both arms, back, jaw, or stomach.
- Cold sweats and nausea.

However, these are typically the symptoms experienced by Caucasian men. Women and minorities often have symptoms very different from those traditionally associated with an acute myocardial infarction (AMI) or angina (AHRQ, 2006; NIH, 2003).

According to the Agency for Healthcare Research and Quality (AHRQ) (2006), emergency room doctors miss diagnosing about 2 percent of women and minority patients with heart attacks or unstable angina because they do not have chest pain or other symptoms typically associated with a heart attack. When these patients are mistakenly sent home from the ER, they are twice as likely to die from their heart problems as similar patients who are admitted to the hospital. In the study reported by AHRQ (2006), the patients who were misdiagnosed tended to be women under the age of 55 or minorities who reported shortness of breath as their chief symptom—instead of chest pain—and/or to have apparently normal electrocardiograms (AHRQ, 2006).

The National Institutes of Health's (NIH) (2003) study of women's symptoms prior to heart attack indicates that about 95% said they knew their symptoms were new or different a month or more before experiencing their AMI. This was true even when the symptoms were common ones and varied in severity. The most frequently reported symptoms were unusual fatigue (70.7%), sleep disturbance (47.8%), and shortness of breath (42.1%). Notably, fewer than 30% of the women reported chest pain and discomfort prior to AMI, and 43% did not experience chest pain during AMI. Most clinicians continue to consider chest pain as the most important AMI symptom for both women and men (NIH, 2003).

This research, funded by the National Institute of Nursing Research (NINR), part of the National Institutes of Health, Department of Health and Human Services, offers hope that both women and clinicians will realize the wide range of symptoms that can indicate heart attack. It is important to detect symptoms at the earliest possible time in order to prevent or ease AMI (NIH, 2003).

Major prodromal symptoms in order of reported frequency include (NIH, 2003):

- Unusual fatigue - 70%
- Sleep disturbance - 48%
- Shortness of breath - 42%
- Indigestion - 39%
- Anxiety - 35%

Major acute symptoms during AMI in order of reported frequency include (NIH, 2003):

- Shortness of breath - 58%
- Weakness - 55%
- Unusual fatigue - 43%
- Cold sweat - 39%
- Dizziness - 39%

Treatment Recommendations

The latest evidence-based guidelines for the prevention of CVD in Women (Mosca et al., 2004) developed a range of recommendations based on the strength of the evidence. Table 6 illustrates the classification and levels of evidence.

Table 6. Classification and Levels of Evidence (Mosca et al., 2004)	
Classification	
Class I	Intervention is useful and effective
Class IIa	Weight of evidence/opinion is in favor of usefulness/efficacy
Class IIb	Usefulness/efficacy is less well established by evidence/opinion
Class III	Intervention is not useful/effective and may be harmful
Level of Evidence	
A	Sufficient evidence from multiple randomized trials
B	Limited evidence from single randomized trial or other nonrandomized studies
C	Based on expert opinion, case studies, or standard of care
Generalizability index	
1	Very likely that results generalize to women
2	Somewhat likely that results generalize to women
3	Unlikely that results generalize to women
0	Unable to project whether results generalize to women

For women in the **High risk** group:

Class I recommendations include:

- Smoking cessation
- Physical activity/cardiac rehabilitation
- Diet therapy
- Weight maintenance/reduction
- Blood pressure control
- Lipid control/statin therapy
- Aspirin therapy
- Beta Blocker therapy
- ACE inhibitor therapy (ARBs if contraindicated)
- Glycemic control in diabetics

Class IIa recommendations include:

- Evaluate/treat for depression

Class IIb recommendations include:

- Omega 3 fatty-acid supplementation
- Folic acid supplementation

For women in the **Intermediate risk** group:

Class I recommendations include:

- Smoking cessation
- Physical activity
- Heart-healthy diet
- Weight maintenance/reduction
- Blood pressure control
- Lipid control

Class IIa recommendations include:

- Aspirin therapy

For women in the **Lower risk** group:

Class I recommendations include:

- Smoking cessation
- Physical activity
- Heart-healthy diet
- Weight maintenance/reduction
- Treat individual CVD risk factors as indicated

Stroke prevention among women with atrial fibrillation

Class I recommendations:

High-intermediate risk of stroke:

- Warfarin therapy

Low risk of stroke or contraindication to warfarin

- Aspirin therapy

For Women Who Have Heart Disease

Once heart disease is diagnosed, it is extremely important to control it. In addition to the reduction of risk factors, certain tests are needed to assess progression of the disease and effectiveness of the risk reduction strategies. The NHLBI (2003a) recommends the following:

Screening Tests

After taking a careful medical history and doing a physical examination, your healthcare provider may recommend the following:

Electrocardiogram (ECG or EKG) This test can show abnormal heartbeats, heart muscle damage, blood flow problems in the coronary arteries, and heart enlargement.

Stress test (or treadmill test or exercise ECG) records the heart's electrical activity during exercise, usually on a treadmill or exercise bike. If you are unable to exercise due to arthritis or another health condition, a stress test can be done without exercise. Instead, you can take a medicine that increases blood flow to the heart muscle and shows if there are any problems in that flow.

Nuclear scan (or thallium stress test) shows the working of the heart muscle as blood flows through the heart. A small amount of radioactive material is injected into a vein, usually in the arm, and a camera records how much is taken up by the heart muscle.

Echocardiography changes sound waves into pictures that show the heart's size, shape, and movement. The sound waves also can be used to see how much blood is pumped out by the heart when it contracts.

Coronary angiography (or angiogram or arteriography) shows an x ray of blood flow problems and blockages in the coronary arteries. A thin, flexible tube, or catheter, is threaded through an artery of an arm or leg up into the heart. A fluid is then injected into the tube, allowing the heart and blood vessels to be filmed as the heart pumps. The picture is called an angiogram or arteriogram.

Ventriculogram is a picture of the heart's main pumping chamber, the left ventricle. The procedure is similar to the one described for coronary angiography, but the catheter is put in the left ventricle.

Intracoronary ultrasound uses a catheter that measures blood flow. It gives a picture of the coronary arteries that shows the thickness and other features of the artery wall. This test allows for blood flow and any blockages to be visualized.

In addition, several new, highly sensitive screening tests have been developed: **Carotid doppler ultrasound** uses sound waves to detect blockages and narrowing of the carotid artery, both of which can lead to a heart attack or stroke.

Electron-beam computed tomography (EBCT) is a superfast scan that provides a snapshot of the calcium buildup in your coronary arteries. It can pick up heart disease before you feel any symptoms.

High-sensitivity C-reactive protein blood test measures the level of this protein in your blood. High levels mean inflammation in the artery walls, which may raise your heart disease risk.

Medications

Medications may be used to treat a risk factor such as high blood pressure or high blood cholesterol, or relieve the chest pain that often accompanies heart disease. Specific medications used to treat hypertension can be obtained from:

<http://www.nhlbi.nih.gov/guidelines/hypertension/express.pdf> and
http://patients.uptodate.com/topic.asp?file=kidn_dis/7485.

Among the medications that may be used are:

- **Digitalis** makes the heart contract harder and is used when the heart can't pump strongly enough on its own. It also slows down some fast heart rhythms.
- **ACE (angiotensin converting enzyme) inhibitors** stop the body from producing a chemical that narrows blood vessels. They are used to treat high blood pressure and damaged heart muscle. They also can prevent kidney damage in some people with diabetes.
- **Beta blockers** slow the heart and allow it to beat with less force. They are used for high blood pressure, chest pain, and to prevent a repeat heart attack.
- **Nitrates** (including nitroglycerine) relax blood vessels and relieve chest pain.
- **Calcium-channel blockers** relax blood vessels. They are used for high blood pressure and chest pain.
- **Vasodilators** may be used to expand blood vessels, thereby reducing the pressure in the blood vessels.
- **Diuretics** decrease fluid in the body and are used for high blood pressure.
- **Thrombolytic Agents**, known as "clot-busting" medications, are given during an AMI to break up a clot and restore blood flow in a coronary artery.
- **Anticoagulants** are used to reduce the risk of blood clots in patients with unstable angina.
- **Aspirin**. This well-known "wonder drug" can help to lower the risk of a heart attack or stroke for those who have already had one. It can also help to keep arteries open in those who have had a previous heart bypass or other artery-opening procedure, such as angioplasty. In addition, aspirin is given to people who arrive at a hospital emergency department with a suspected heart attack or stroke.

Aspirin is not approved by the Food and Drug Administration for the prevention of heart attacks in those who have never had a heart attack or stroke. It may even be harmful, especially for those with no heart disease risk. Take daily aspirin to prevent heart disease only with one's healthcare provider's recommendation and guidance.

- **Postmenopausal hormone therapy** (formerly known as hormone replacement therapy) was once thought to lower the risk of heart attack and stroke for women with heart disease. But research now shows that women with heart disease should not take it.

Postmenopausal therapy can involve the use of estrogen plus progestin or estrogen alone.

Studies on each type show that, for women with heart disease: estrogen plus progestin therapy increases the risk of heart attack during the first few years of use and also increases the risk of blood clots, stroke, and breast cancer; estrogen-only therapy will not prevent heart attacks in women with heart disease. This type of hormone therapy actually increases the chances of developing heart disease, breast cancer, and other serious conditions.

- **Statins.** These are the drugs most often prescribed for people who need a cholesterol-lowering medicine. Of all available medications, statins lower LDL cholesterol the most, usually by 20 to 60 percent. Side effects are usually mild, although liver and muscle problems occur rarely. If muscle problems occur, you should contact your doctor promptly.
- **Bile Acid Sequestrants.** These medications lower LDL cholesterol by about 10 to 20 percent. Bile acid sequestrants are often prescribed along with a statin to further decrease cholesterol levels. Side effects may include constipation, bloating, nausea, and gas. However, long-term use of these medicines is considered safe.
- **Nicotinic Acid.** Nicotinic acid, or niacin, lowers total cholesterol, LDL cholesterol, and triglyceride levels, while also raising HDL cholesterol. While nicotinic acid is available without a prescription, use it under a doctor's care because of possibly serious side effects. In some people, it may inflame peptic ulcers or cause liver problems, gout, or high blood sugar.
- **Fibrates.** These drugs can reduce triglyceride levels by 20 to 50 percent, while increasing HDL cholesterol by 10 to 15 percent. They're not very effective for lowering LDL cholesterol. While the drugs usually cause only mild side effects, they can increase the chances of developing gallstones and heighten the effects of blood-thinning drugs.
- **Ezetimibe.** This is the first in a new class of cholesterol-lowering agents that interfere with the absorption of cholesterol in the intestine. It can be used alone or in combination with a statin. Side effects may include back and joint pain.

Special Procedures

Advanced heart disease may require special procedures to open an artery and improve blood flow. These are usually done to ease severe chest pain or clear blood vessel blockages. They include:

Percutaneous transluminal coronary angioplasty (PTCA) (also called balloon angioplasty). In this procedure, a fine tube, or catheter, is threaded through an artery into the narrowed heart vessel. The catheter has a tiny balloon at its tip, which is repeatedly inflated and deflated to open and stretch the artery, improving blood flow. Often, a tiny tube called a **stent** is permanently inserted in the artery to keep it open.

Coronary artery bypass graft, or "bypass surgery." A piece of vein is taken from the leg or a section of an artery is taken from the chest or wrist. This piece is attached to the heart artery both above and below the narrowed area, making a bypass around the blockage.

Heart transplant may be necessary for some patients when cardiac muscle is severely damaged.

Prevention of Heart Disease in Women: A Critical Role for Nurses

Research is providing compelling evidence that coronary heart disease is largely preventable. A key strategy for addressing the risk factors for the development of heart disease, is to educate the public and healthcare providers about the importance of prevention (CDC, 2006). Therefore, primary prevention is the key to managing heart disease in women.

Multiple healthcare organizations provide prevention information and education regarding the prevention of heart disease. And of course, this is useful information. We all have heard, repeatedly, that our lifestyles need to change: we need to quit smoking, eat a more healthy diet, increase our activity level and decrease our stress levels.

These are the same interventions that would be helpful for so many of the chronic “lifestyle” illnesses besides heart disease: such as hypertension, hypercholesterolemia, diabetes, cancer, etc. Most of us have heard these messages, often repeatedly. And some of these messages have been heeded. The American Lung Association (2003) reports that between 1995 and 2001 the proportion of former smokers doubled: 49.2 percent of those who had ever smoked, age 18 or older, had quit. It is estimated that in 2001, 44.8 million adults were former smokers, 25.5 million men and 19.2 million women. More and more people are quitting smoking each day. Unfortunately, the same cannot be true of the other health risks associated with heart disease.

Many of the lifestyle changes that need to be made in order to reduce the risk of CVD as well as other chronic illnesses are changes that people often feels are too difficult and impact on the immediate quality of their lives. However, this is clearly a short-sighted perspective. Despite the short-sightedness, behavior changes are not easy for most people to make. We are all creatures of habit.

One of the most far reaching interventions that nurses can provide to our women patients is the concept of empowerment relative to one’s own health. Healthcare providers need to become partners with their women patients in order to become knowledgeable about prevention, early recognition, and treatment and management of heart disease.

According to the NHLBI (2001) healthcare providers are generally not doing enough to assess women’s risk of developing heart disease and counseling them about lowering their risk factors. Nurses can play an important advocacy and health teaching role, as well as the critical roles of care and treatment provider.

Although healthcare providers have historically not been aware of this significant health risk in their women patients, nor have they been quick to detect risk factors and actual heart disease in women, accurately diagnose their symptoms or intervened effectively, it is time for that to change. Nurses must advocate for their women patients by screening for heart disease during routine healthcare visits, or whenever nurses provide care to women patients. This screening should begin when women are in their 30s and continue throughout the life cycle.

Nurses need to take an active role in the teaching and counseling of women regarding the risk factors that lead to heart disease and the steps that women can take to lower their risk of developing heart disease. Topics for health teaching include: Smoking cessation, weight reduction, if applicable and increasing activity levels. Interventions to lower the risk of hypertension, high cholesterol, and diabetes are all part of health education.

These messages to make healthy lifestyle choices have been in the media for many years. Intellectually, many people recognize the need to make better health choices. Despite what we know, change is not an easy thing to accomplish. The question remains, how can we motivate others and ourselves as well, to make healthy behavior changes?

An individual's path to health behavior change is on a continuum, from increasing knowledge and awareness to changing attitudes and misperceptions to changing behavior. This is important for nurses to remember—changing behavior is a complex process that often takes time. Even small changes should be heralded as important in the overall reduction of risk for heart disease.

Some important points for nurses to teach or reinforce in their women patients (NHLBI, 2001):

- Knowledge is power; the more a woman knows about heart disease and her own family history as well as her own risk factors for development, the more able she will be to act;
- Make the time to care for yourself. Caring for others is important to most women; however, they must be in good physical condition in order to do so well. A powerful woman takes care of herself as well as others;
- Women are the heart of the family; be a role model for your children;
- The importance of using Emergency Medical Services (EMS), because early intervention does save lives; women **should not wait** if they are experiencing symptoms'
- Focus on a single healthy behavior to begin with; build on this and help to prevent relapses. Change behaviors for life.

Table 7. Heart Disease Prevention Patient Education Guide	
Know Personal/Familial Risk	<ul style="list-style-type: none"> • Discuss family history with patient; know familial risks; know risk levels related to ethnicity and racial factors.
Smoking Cessation	<ul style="list-style-type: none"> • Support the patient to quit smoking, utilizing current treatment guidelines. • Follow the 5 As of smoking cessation: • Ask: Identify and document tobacco use status for every patient at every visit. • Advise: In a clear, strong, and personalized manner, urge every tobacco user to quit. • Assess: Is the tobacco user willing to make a quit attempt at this time? • Assist: For the patient willing to make a quit attempt, use counseling and pharmacotherapy to help him or her quit. • Arrange: Schedule followup contact, in person or by telephone, preferably within the first week after the quit date. • Follow current treatment guidelines for smoking cessation; these can be obtained from: http://www.surgeongeneral.gov/tobacco/tobaqrg.htm.
Blood Pressure Control	<ul style="list-style-type: none"> • Frequent monitoring of blood pressure; blood pressure values should be obtained at every healthcare visit; focus on lowering blood pressure to normotensive levels.
Cholesterol Control	<ul style="list-style-type: none"> • Serum lipid profiles regularly, treatment of high levels following current treatment guidelines.
Blood Glucose Control	<ul style="list-style-type: none"> • Regular serum glucose monitoring; treatment of impaired glucose levels following current treatment guidelines (ADA, 2004).
Weight Control/Reduction	<ul style="list-style-type: none"> • Maintain a healthy weight; weight reduction following accepted and safe weight reduction methods should be encouraged. • One example of the many weight control/reduction programs available is The American Heart Association's No Fad Diet, which focuses on diet and exercise. This can be accessed at http://www.americanheart.org/presenter.jhtml?identifier=1200014.
Activity Level	<ul style="list-style-type: none"> • If not contraindicated for health reasons, moderate exercise

	<p>for 30 minutes daily.</p> <ul style="list-style-type: none"> Multiple organizations have exercise programs, among them are the American Heart Association's Choose to Move program which can be accessed at http://www.choosetomove.org/.
Stress Management	<ul style="list-style-type: none"> Each individual makes choices about how to manage their daily stressors; assist patients to identify stressors in their lives and a variety of management approaches. This can range from saying "no" to too many time and energy obligations to referral for psychotherapy or psychiatric evaluation. Explore stress reduction strategies such as diaphragmatic breathing, progressive muscle relaxation, mediation, yoga, etc. Provide referrals to other healthcare providers as appropriate.

An important consideration for lowering the risk of CVD is educating the public about their blood pressure. As mentioned earlier in this course, 30% of people with hypertension do not know they have it. While hypertension is the most common primary diagnosis in the US, with 35 million office visits listing hypertension as the primary diagnosis, this staggering number includes only those who know they have hypertension. Clearly, those who are already seeing healthcare providers continue to need intervention to reduce their BP, but it is those individuals who are unaware of their BP who desperately need intervention. Nurses have access to patients in a variety of settings, many of them non-traditional healthcare settings. An important health intervention for nurses may be blood pressure screenings in those non-traditional settings.

Conclusion

Heart disease is clearly not just a man's disease. Women suffer from, and die from, heart disease more than any other health condition. Women need to be empowered to manage their own health, in cooperation with healthcare providers. They need information, education and counseling about risk factors for heart disease and they need help to make the behavior changes needed to prevent heart disease and lower their risk of developing the number one killer of women.

Women need healthcare providers who are aware of this significant health threat, who can identify risk factors, detect heart disease early, provide interventions to lower the risk of heart disease and who can treat women with the latest "best practice" interventions. Nurses, as the largest profession in healthcare, and one who has access to patients in multiple settings, can be instrumental in this effort.

Resources

American Heart Association

Go Red for Women

<http://www.goredforwomen.org/>

The American Lung Association

61 Broadway, 6th Floor

NY, NY 10006

212-315-8700

www.lungusa.org

National Coalition for Women with Heart Disease

www.womenheart.org

National Heart Lung and Blood Institute

National Institutes of Health

<http://www.nhlbi.nih.gov/>

National Women's Health Information Center

Heart and Cardiovascular Disease

<http://www.4woman.gov/faq/heartdis.htm>

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Women and Heart Disease: An Equal Opportunity Killer Course Exam

After studying the downloaded course and completing the course exam, you need to enter your answers online. **Answers cannot be graded from this downloadable version of the course.** To enter your answers online, go to e-leaRN's Web site, www.elearnonline.net and click on the Login/My Account button. As a returning student, login using the username and password you created, click on the "Go to Course" link, and proceed to the course exam.

1. Heart disease is the leading cause of death for women; nearly 2/3 of deaths related to heart attack in women occur in those who have not had previous symptoms.
 - A. True.
 - B. False.

2. After a heart attack,
 - A. Women are treated as aggressively by healthcare providers as are men.
 - B. Women have outcomes that are comparable to those of men.
 - C. Thirty-eight percent of women will die within the first year.
 - D. Women tend to recover faster and more thoroughly than do men.

3. The state with the highest percentage of respondents who reported a history of MI or CHD (2005) was:
 - A. New York
 - A. West Virginia
 - B. California
 - C. South Dakota

4. All of the following are risk factors for the development of heart disease in women EXCEPT:
 - A. A blood pressure reading of 140/90 mmHg
 - B. A fasting blood glucose level of 100 mg/dL
 - C. An LDL level of 165 mg/dL
 - D. Smoking ½ pack of cigarettes per day.

5. Obesity is defined as a body mass index (BMI) of
 - A. 25 to 29.9 kg/m²
 - B. 30 kg/m²
 - C. Under 25 kg/m²
 - D. None of the above

6. In the Women's Health Initiative Observational Study (Wassertheil-Smoller et al., 2004) the researchers reported that among women with no history of cardiovascular disease, depression was an independent predictor of cardiovascular disease death and all-cause mortality after adjustment for age, race, education, income, diabetes, hypertension, smoking, high cholesterol level requiring medication, body mass index, and physical activity.
 - A. True.
 - B. False.

7. According to AHRQ, emergency room doctors miss diagnosing about 2 percent of women and minority patients with heart attacks or unstable angina because they do not have chest pain or other symptoms typically associated with a heart attack.
- A. True.
 - B. False.
8. Symptoms, cited in this course, that women frequently suffer while having an acute myocardial infarction (AMI), are all of the following EXCEPT:
- A. Unusual fatigue
 - B. Difficulty sleeping
 - C. Pain radiating down both arms
 - D. Shortness of breath
9. Class I recommendations for women at high risk for heart disease are the following treatments:
- Smoking cessation
 - Physical activity/cardiac rehabilitation
 - Diet therapy
 - Weight maintenance/reduction
 - Blood pressure control
 - Lipid control/statin therapy
 - Aspirin therapy
 - Beta Blocker therapy
 - ACE inhibitor therapy (ARBs if contraindicated)
 - Glycemic control in diabetics
- A. True.
 - B. False.
10. The nurse's role in the prevention of heart disease in women focuses on all the following nursing interventions EXCEPT:
- A. Health teaching and counseling.
 - B. Advocacy.
 - C. Early detection.
 - D. Treatment through the provision of coronary bypass surgery.