



Research on Cardiovascular Disease in Women

The mission of AHRQ is to improve the quality, safety, efficiency, and effectiveness of health care by:

- Using evidence to improve health care.
- Improving health care outcomes through research.
- Transforming research into practice.

Introduction

Cardiovascular disease (CVD) is the number one killer of women in the United States. Long thought of as primarily affecting men, we now know that CVD—including heart disease, hypertension, and stroke—also affects a substantial number of women. Experts estimate that one in two women will die of heart disease or stroke, compared with one in 25 women who will die of breast cancer.

Recent statistics show 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. The reasons for these differences are not well understood. We know that women tend to get heart disease about 10 years later in life than men, and they are more likely to have coexisting chronic conditions. 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.

AHRQ-Sponsored Research

The Agency for Healthcare Research and Quality (AHRQ) supports a vigorous women's health research program, including research focused on CVD in women. AHRQ-supported projects are addressing women's access to quality health care services, accurate diagnoses, appropriate referrals for procedures, and optimal use of proven therapies.

See the back cover of this fact sheet to find out how you can get more detailed information on AHRQ's research programs and funding opportunities.

- *Management of chest pain differs by sex and race.*

Researchers analyzed the care of 72,508 people with hypertension who were treated at about 50 primary care practices in the Southeastern United States. More men than women received definitive diagnoses of angina, while more women than men were diagnosed with vague chest pain. Also, women and blacks received fewer cardiovascular medications than men and whites. Hendrix, Mayhan, Lackland, and Egan,





Am J Hypertens 18(8):1026-1032, 2005 (AHRQ grant HS10871).

- *Women with atherosclerosis and high cholesterol receive less intense cholesterol management than men.*

The researchers examined cholesterol management of 243 primary care patients from one academic medical center. The patients had coronary heart disease (CHD), cerebrovascular disease, or peripheral vascular disease and high LDL (bad) cholesterol. Cholesterol management by either medication adjustments or LDL monitoring occurred at 31.2 percent of women's visits and 38.5 percent of men's visits. Persell, Maviglia, Bates, and Ayanian, *J Gen Intern Med* 20:123-130, 2005 (AHRQ grant T32 HS00020).

- *Existing heart disease is undiagnosed in half of women who have a first heart attack.*

The researchers reviewed medical records of 150 women in one Minnesota county who suffered a heart attack between 1996 and 2001. Over the 10 years preceding their first heart attack, the women made a total of 8,732 outpatient visits and had 457 hospitalizations, but only 52 percent of the women had been diagnosed with heart disease. About 80 percent of women with high blood pressure were treated with antihypertensive medications, but only 28 percent of women were prescribed drug therapy for high cholesterol or lipid levels. Yawn, Wollan, Jacobsen, et al., *J Women's Health* 13(10):1087-1100, 2004 (AHRQ grant HS10239).

- *Younger women with heart failure have worse quality of life than men and older women.*

Shortness of breath, fatigue, and emotional problems caused by heart failure lead to reduced quality of life, which negatively affects younger women with heart failure more than

elderly women or men of any age. However, women younger than 65 in this study had more improvement in fatigue over time than older women and more improvement in emotional symptoms over time than men age 65 or older. Hou, Chui, Eckert, et al., *Am J Crit Care* 13(2):153-161, 2004 (AHRQ grant HS09822).

- *Treatment of high cholesterol in women should be based on all risk factors for heart disease.*

For women who don't have cardiovascular disease, use of cholesterol-lowering drugs to treat high cholesterol does not affect rates of death due to CHD or total death rates. In women with known cardiovascular disease, lipid-lowering therapy can reduce CHD-related death, heart attack, and heart surgery, but it does not affect total mortality. Walsh and Pignone, *JAMA* 291(18):2243-2252, 2004 (AHRQ contract 290-97-0013).

- *Women and men with cardiovascular disease and high cholesterol may receive different levels of treatment.*

This study found that among people with cardiovascular disease, men have their cholesterol measured more often, are treated more aggressively (e.g., with statin drugs), and have lower levels of so-called "bad" cholesterol or LDL-C than women. Kim Hofer, and Kerr, *J Gen Intern Med* 18:854-863, 2003 (AHRQ grant HS11540).

- *Diabetes increases a woman's risk of death from coronary heart disease.*

These researchers found that compared with women who had neither diabetes nor CHD, women with only CHD had nearly double the risk of CHD-related death, while women with only diabetes had nearly four times the risk of CHD-related death. Those who had both CHD and diabetes were at greatest risk for CHD-related death. Natarajan, Liao, Cao, et al., *Arch Intern Med*

163:1735-1740, 2003 (AHRQ grant HS10871).

- *Researchers find male-female differences in receipt of recommended cardiovascular care.*

These researchers evaluated differences between men and women in rates of receipt of recommended cardiovascular and diabetes care for enrollees in 10 commercial and 9 Medicare plans. In commercial plans, an average of 73.6 percent of men and 63.8 percent of women without a contraindication were prescribed a beta-blocker after a heart attack. Among the three plans with significant male-female differences, all favored men, ranging from an advantage of 23.4 to 40 percentage points. Bird, Fremont, Wickstrom, et al., *Women's Health Issues* 13:150-157, 2003 (AHRQ contract 290-00-0012).

- *Lack of studies on women limits usefulness of research on coronary heart disease.*

Although CHD causes more than 250,000 deaths in women each year, much of the research on CHD in the last 20 years has either excluded women or included very few women. As a result, many of the tests and therapies used to treat women for CHD are based on studies conducted predominantly in men, according to two evidence reviews done by AHRQ's Evidence-based Practice Center (EPC) at the University of California, San Francisco/Stanford. The reviews examined the usefulness of beta-blockers, aspirin, and ACE inhibitors in reducing risk among women with known heart disease; the use of exercise EKG and exercise thallium testing for CHD in women; the efficacy of nitrates to reduce risk for CHD events in women with known heart disease; the role of high cholesterol, diabetes, and high homocystine levels as risk factors for CHD in women; and other related topics. Copies of the two reports,

Results of a Systematic Review of Research on Diagnosis and Treatment of Coronary Heart Disease in Women, Evidence Report/Technology Assessment No. 80 (AHRQ Publication No. 03-E035 full report; 03-E034 summary)* and *Diagnosis and Treatment of Coronary Heart Disease in Women: Systematic Reviews of Evidence on Selected Topics*, Evidence Report/Technology Assessment No. 81 (AHRQ Publication No. 03-E037 full report; 03-E036 summary) are available from AHRQ (contract 290-97-0013).*

- *Women with symptomatic heart failure benefit when treated with ACE inhibitors and/or beta-blockers.*

Researchers at AHRQ's Southern California EPC examined evidence on pharmacologic management of heart failure and found that treatment with ACE inhibitors was beneficial in women, but it did not reduce mortality in women with asymptomatic left ventricular systolic dysfunction. They also found that both women and men with symptomatic heart failure have reduced mortality when treated with beta-blockers. Copies of Evidence Report/Technology Assessment No. 82, *Pharmacologic Management of Heart Failure and Left Ventricular Systolic Dysfunction: Effect in Female, Black, and Diabetic Patients, and Cost-Effectiveness* (AHRQ Publication No. 03-E044 summary; 03-E045 full report) are available from AHRQ (contract 290-97-0001).*

- *Insurance status does not explain the disparity in heart attack survival.*

An analysis of data on 327,040 men and women enrolled in a national registry of patients revealed that women were less likely to receive aspirin, beta-blockers, intravenous heparin, or nitrate therapies within the first 24 hours of hospital admission for heart attack. They also were less likely to undergo coronary angiography, angioplasty, or



bypass surgery, but they were more likely to die in the hospital. Canto, Rogers, Chandra, et al., *Arch Intern Med* 162:587-593, 2002 (AHRQ grant HS08843).

- *Women have a higher prevalence of white-coat hypertension than men.*

Researchers at the Johns Hopkins Evidence-based Practice Center examined evidence on the utility of blood pressure (BP) monitoring outside of the clinic setting. Although they found some support for the use of ambulatory BP monitoring, in general, the evidence was insufficient to compare clinic BP monitoring with BP monitoring elsewhere. Evidence on BP monitoring among population subgroups was rarely stratified by race or sex. The only notable subgroup finding was a higher prevalence of white-coat hypertension in women. Copies of Evidence Report/Technology Assessment No. 63, *Utility of Blood Pressure Monitoring Outside of the Clinic Setting* (AHRQ Publication No. 03-E003 summary; 03-E004 full report) are available from AHRQ (contract 290-97-0006).*

- *Study finds an association between age and heart attack outcomes.*

In an editorial accompanying study findings on male and female mortality rates after heart attack, this researcher notes that the interaction of age and sex remains a significant predictor of heart attack-related death, even after adjustment for demographic factors, clinical characteristics, and inpatient

cardiac care. The study reported an 11 percent 2-year mortality rate for women before age 60 (vs. 7 percent for men) and a lower mortality rate for women after age 79 (46 vs. 51 percent for men). Ayanian, *Ann Intern Med* 134(3):239-241, 2001 (AHRQ grant HS09718).

- *Women and minorities may have atypical symptoms when suffering a heart attack or angina.*

ER doctors miss diagnosing about 2 percent of patients with heart attacks or unstable angina because they do not have 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. Misdiagnosed patients 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. Pope, Aufderheide, Ruthazer, et al., *New Engl J Med* 342(16):1163-1170, 2000 (AHRQ grant HS07360).

- *Black women are not as likely as others to receive life-saving therapies for heart attacks.*

Most of the 1 million U.S. patients who suffer a heart attack each year are candidates for reperfusion therapy, either thrombolytic (clot-busting) drugs or primary angioplasty. In a study of nearly 27,000 Medicare beneficiaries who met the strict criteria for

reperfusion therapy between February 1994 and July 1995, only 44 percent of eligible black women received the treatment, compared with 59 percent of white men, 50 percent of black men, and 56 percent of white women. Canto, Allison, Kiefe, et al., *New Engl J Med* 342(15):1094-1100, 2000 (AHRQ grants HS08843 and HS09446).

More Information

For more information on AHRQ initiatives related to women's health, please contact:

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