Tracking Women's Awareness of Heart Disease
An American Heart Association National Study

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Background—Cardiovascular disease (CVD) is the leading cause of mortality in men and women in the United States, yet prior research has shown a lack of awareness of risk among women. The purpose of this study was to assess the contemporary awareness, knowledge, and perceptions related to CVD risk among American women and to evaluate trends since 1997, when the American Heart Association initiated a national campaign to improve awareness of CVD among women.

Methods and Results—A telephone survey of a nationally representative random sample of women was conducted in June and July 2003, with an oversampling of black and Hispanic women; results were compared with those of similar surveys in 2000 and 1997. The present survey included 1024 respondents age ≥25 years; 68% were white, 12% black, 12% Hispanic, and 8% other ethnicities. Awareness, knowledge, and perceptions about heart disease were evaluated by use of a standard interviewer-assisted questionnaire. A shift in awareness of heart disease as the leading killer of women has occurred since 1997. In 2003, 46% of respondents spontaneously identified heart disease as the leading cause of death in women, up from 30% in 1997 ($P<0.05$) and 34% in 2000 ($P<0.05$). In contrast, the percentage of women citing cancer as leading cause of death has significantly decreased. Black, Hispanic, and younger women (<45 years old) had lower awareness of heart disease as their leading cause of death than did white and older women. Nearly all women reported comfort in discussing prevention with healthcare providers, but only 38% of women reported that their doctors had ever discussed heart disease with them.

Conclusions—Awareness of CVD has increased, although a significant gap between perceived and actual risk of CVD remains. Educational interventions to improve awareness and knowledge are needed, particularly for minority and younger women. **(*Circulation*. 2004;109:573-579.)**

Key Words: cardiovascular diseases ■ prevention ■ risk factors ■ epidemiology ■ women

Heart disease and stroke are the first and third leading causes of death among American women.[1] Overall, cardiovascular disease (CVD) claims the lives of more than 500 000 women each year in the United States; this equates to 41.3% of all female deaths, and more than all types of cancers combined.[2] Black women have the highest CVD mortality rate among ethnic minority groups.[1] Despite these statistics, a national survey conducted by the American Heart Association (AHA) in 1997 showed that only 7% of women perceived CVD to be their greatest health threat and less than one third knew it was the leading cause of death.[3] As a result, the AHA initiated a public health campaign targeted to women to increase awareness and improve lifestyle behaviors related to CVD. A follow-up survey in 2000 showed only a small change in awareness.[4,5] Since then, the AHA and several other organizations have continued efforts to educate women about CVD risk.

The purpose of this study was to evaluate the current awareness, perception, and knowledge of CVD among women overall, by race/ethnicity, and according to age. A major objective was to evaluate trends in these parameters over time. This study compared current data with those from 1997 and 2000.

Methods

Study participants were obtained from a national random sample of women age 25 years or older, with an oversampling of black and Hispanic women, as described previously for the 1997 survey.[3] A base sample was created using a random sample database in which all eligible blocks within a county of the United States were organized in ascending order by area code, exchange, and block number. From a random start, blocks were systematically selected with equal probability across all eligible blocks and in proportion to their density of listed households. A 2-digit random number ranging from 00 to 99 was appended to the area code, exchange, and block number to form a 10-digit telephone number. A targeted random digit database was used to allow the oversampling of black and Hispanic women, in which a density code was assigned on the basis of the exchange and census tract in which a household was located. The density code reflected the probability of either a black or Hispanic household, and for the present study, density codes ranging

Received December 12, 2003; accepted December 12, 2003.

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Circulation **is available at http://www.circulationaha.org** **DOI: 10.1161/01.CIR.0000115222.69428.C9**

from 30% to 100% were used. The sampling error for this study was ±3.1% at the 95% confidence interval.

Professional interviewers employed by a national opinion research company (Harris Interactive Inc) conducted the telephone survey between June 26 and July 14, 2003. The interviewer called and asked to speak to a woman if one did not answer, and then asked the respondent to confirm that she was at least 25 years of age. Subjects were informed that all responses were confidential and that information provided would be used to develop health communications for women like them. Interviews lasted approximately 10 minutes and were conducted in English. All telephone calls were made in the evenings and on weekends to ensure that women who worked outside the home were included. All calls were monitored to ensure the accuracy of the respondents' answers. A standardized 32-item questionnaire with a mixture of Likert scale, open-ended, and recognition questions was used. As in the previous surveys conducted in 1997 and 2000, questions were divided into 4 sections: general awareness of women's health issues; communications and behaviors related to heart disease prevention; specific understanding of heart disease and behaviors associated with prevention; and demographic characteristics.[3]

A total of 2025 households were contacted for the random digit database sample in the 2003 survey. Of these contacts, 945 were ineligible and 1080 were eligible. Of those eligible, 56 refused and 1024 agreed to participate. Sampling was discontinued after the 1024 participants were recruited.

The survey data were analyzed with a software program designed for market-survey analysis (Quantum; Quantime Ltd). Data are reported as percentages. Differences in responses between each ethnic and age group and between surveys were analyzed with χ^2 tests. Statistical significance was set at $P<0.05$.

Results

Demographics/Risk Factors

The demographic characteristics of the 1024 respondents in the 2003 survey are shown in Table 1. The distribution of participants according to race/ethnicity was 68% white, 12% black, 12% Hispanic, and 8% other ethnicities. Differences among racial/ethnic groups were noted for several demographic characteristics, including age, marital status, number of children, and household income. The demographic characteristics of respondents in the present survey were similar to those of respondents in the 1997 and 2000 surveys.[3–4]

A small number of women (7%) reported a personal history of heart attack or stroke. High cholesterol was reported by 29%, and 69% said their cholesterol level had been checked within the previous 18 months. However, only 26% knew their LDL cholesterol number, and 29% reported knowing their HDL cholesterol level. A history of high blood pressure was reported by 15% of respondents, and 96% said it had been checked within 18 months. Current smoking was reported by 19% of women, and 11% said they had a history of diabetes. Only a minority of women reported exercising more than 3 times per week (28%), and 1 in 5 indicated that they almost never get any aerobic exercise. On the basis of the height and weight reported, the mean body mass index (BMI) of respondents was in the overweight range, at 27.0 kg/m^2. Only 1 in 3 women (33%) had a BMI ≤24 kg/m^2.

Awareness and Perception About CVD

The distribution of responses to the question "What is the leading cause of death for all women?" is contrasted with the numbers for the actual causes of death in Figure 1, a and b. Nearly half of all women correctly identified coronary heart disease (CHD)/heart attack as the leading killer of women, whereas 20% of respondents cited cancer in general, and 15% cited breast cancer (Table 2). Awareness of heart disease as the leading cause of death has increased significantly from 30% in 1997 to 46% in 2003 ($P<0.05$). There was improvement among all age groups, although those younger than 45 years of age generally cited heart disease less frequently than did older women in each survey year (Table 3). White women had the highest awareness rate in each survey year. Awareness among black women increased significantly from 1997 and 2000 to 2003, but rates did not significantly change among Hispanic women.

Nearly two thirds of the respondents (64%) correctly identified that black women are more likely than white women to die from a heart attack or stroke, up significantly from 54% in 2000 and 48% in 1997 (both $P<0.05$). Black women (83%) had the highest rate of correct responses to this statement (white women, 64%; Hispanic women, 45%).

When respondents were asked to identify their greatest health problem, 51% spontaneously identified cancer—breast

TABLE 1. Demographic Characteristics of Respondents

Characteristic	All (n=1024)	Racial/Ethnic Groups			
		White (n=695)	Black (n=127)	Hispanic (n=125)	Other (n=77)
Age, y					
25–34	21	16*	26	33	26
35–44	24	33	24	28	25
45–54	20	31	18	15	23
55–64	24	28*	19	18	18
≥65	11	11	13	7	9
Marital status					
Single, never married	15	11	35*	13	19†
Married or cohabiting	66	71	41*	67	60
Separated or divorced	11	9	11	16†	16†
Widowed	8	9	13	4	5
Education					
Some high school or less	6	4	7	15†	6
High school graduate	24	24	25	26	19
Some college	22	21	26	21	29
2-Year college graduate	14	14	14	14	12
4-Year college graduate	18	20	17	16	13
Postgraduate study	15	17	12	8	21
Household income, $					
<20 000	12	8*	22	17	20
20 000–49 999	32	30	40†	37	31
50 000–99 999	33	35	23†	30	27
≥100 000	7	9	2†	5	7
Personal history of disease					
Diabetes	11	10	14	15	12
Heart attack	3	3	1	3	4
Stroke	4	4	2	2	5

All values are percentages.
*$P<0.05$ vs each other racial/ethnic groups.
†$P<0.05$ vs white.

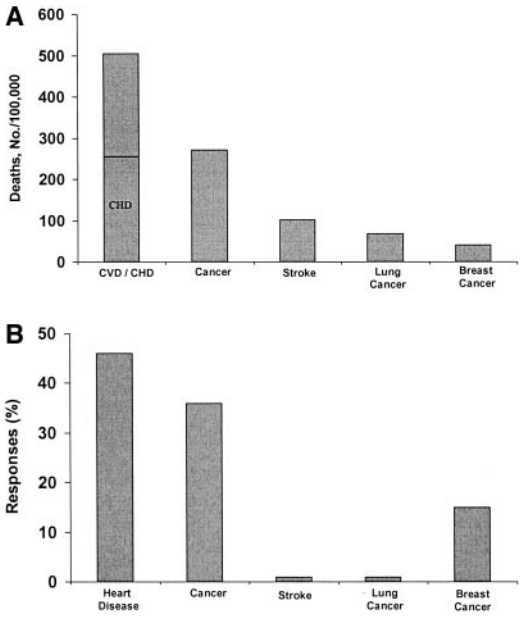

Figure 1. Actual leading cause of death for women (A)[1,2] versus perceived leading cause of death for women (B).

cancer (35%) or cancer in general (16%) (Table 2). The present survey shows that the perception of cancer (cancer in general or breast cancer) as the most important health problem has decreased significantly compared with the 1997 (61%) and 2000 (62%) surveys (both $P<0.05$). Similar trends toward increasing recognition of the importance of CVD to women were seen across age and racial/ethnic groups (Tables 2 and 3). The number of women who perceive heart disease as their leading health problem has nearly doubled—from 7% in 1997 and 8% in 2000% to 13% in the present survey (both $P<0.05$). In each age group, the percentage of respondents spontaneously identifying heart disease as the leading health problem increased between 2000 and 2003. This trend was also seen across racial/ethnic groups, with a significant increase between 2000 and 2003 among white respondents (from 9% to 13%; $P<0.05$) and black respondents (from 3% to 12%; $P<0.05$).

Knowledge of Heart Disease

The respondents' rating of their knowledge of heart disease in women is given in Figure 2. A minority of women (40%) considered themselves to be either "very well" or "well" informed about heart disease. Even fewer Hispanics (33%) and women 25 to 34 years old (27%) felt they were "very well" or "well" informed.

The percentage of women providing correct responses (true or false) to specific statements about heart disease has generally increased since the previous surveys. The percentage of women who recognized that early treatment exists to limit damage from heart attack and stroke increased from 86% in 2000 to 89% in 2003 ($P<0.05$). In 2003, white women remained more likely than black and Hispanic women (92% versus 84% versus 79%, respectively) to recognize the

TABLE 2. Awareness of Leading Cause of Death for Women and Perceived Greatest Health Problem Facing Women by Ethnic Group and Survey Year

				Racial/Ethnic Group								
	All Subjects			White			Black			Hispanic		
Response (Unaided)	2003 (n=1024)	2000 (n=1004)	1997 (n=1000)	2003 (n=695)	2000 (n=625)	1997 (n=658)	2003 (n=127)	2000 (n=155)	1997 (n=130)	2003 (n=125)	2000 (n=148)	1997 (n=126)
Leading cause of death												
Breast cancer	15	14	15	13	15	14	19	19	18	20	13	17
Cancer (general)	20*†	26	35	17*†	25	33	27†	32	41	28†	30†	43
Heart disease/heart attack	46*†	34	30	55*†	38	33	30*†	18	15	27	26	20
Other (each <3%)	6*†	9	10	7	8	8	9	15	12	7	11	9
Don't know/no answer	11*	16	11	9*	14	12	14	16	14	18	20	11
Greatest health problem												
Breast cancer	35	36	34	36	36	34	46	42	38	27	35	34
Cancer (general)	16*†	25	27	14*†	24	27	17*	28	28	22	28	25
Heart disease/heart attack	13*†	8	7	13*†	9	8	12*	3	6	9	5	9
Obesity	6	NA	NA	7	NA	NA	2	NA	NA	8	NA	NA
Other (each <3%)	19	17	17	21†	17	16	15	17	15	20	14	16
Don't know/no answer	9*†	14	15	8*†	14	15	6	10	13	13	18	16

All values are percentages. NA indicates not available.
*$P<0.05$ vs 2000.
†$P<0.05$ vs 1997.
Note: Only statistical comparisons are presented for 2003 vs 2000 and 2000 vs 1997.

TABLE 3. Awareness of Leading Cause of Death for Women and Perceived Greatest Health Problem Facing Women by Age and Survey Year

	Age Group, y											
	25–34			35–44			45–64			≥65		
Response (Unaided)	2003 (n=123)	2000 (n=211)	1997 (n=188)	2003 (n=221)	2000 (n=240)	1997 (n=294)	2003 (n=597)	2000 (n=356)	1997 (n=308)	2003 (n=81)	2000 (n=189)	1997 (n=195)
Leading cause of death												
Breast cancer	19	21	19	23	16	17	10	13	12	6	12	9
Cancer (general)	10*†	28	38	23†	27	33	22†	24	36	28	27	34
Heart disease/heart attack	41*†	20	16	40†	34	28	50†	46	38	53*†	32	34
Other (each <3%)	9	10	12	6	9	10	9	8	7	5*	10	9
Don't know/no answer	21	21	15	8*	14	12	9	9	7	6*	19	14
Greatest health problem												
Breast cancer	43	49	41	41	41	40	31	33	34	28*†	24	20
Cancer (general)	5*†	22	19	16†	22	26	19*†	25	26	21†	31	37
Heart disease/heart attack	10*†	4	4	9	5	5	15	12	11	15*	7	8
Obesity	6	NA	NA	7	NA	NA	6	NA	NA	10	NA	NA
Other (each <3%)	25*†	15	13	18	16	16	21	16	19	14	23	17
Don't know/no answer	10†	10	23	9*	16	13	8*	14	10	10	15	18

All values are percentages.
*$P<0.05$ vs 2000.
†$P<0.05$ vs 1997.
Note: Only statistical comparisons are presented for 2003 vs 2000 and 2000 vs 1997.

availability of early treatments. When asked if women are more likely then men to have atypical or unusual symptoms during a heart attack, 69% of all women responded correctly in 2003, and this was not statistically different from the prior survey. Only women aged 25 to 34 years showed a significant increase in the correct response rate from 2000 to 2003 (from 58% to 71%; $P<0.05$).

Perceptions above the classic symptom of heart disease, chest pain, have declined significantly since 1997 (62% vs 67%; $P<0.05$). In contrast, there has been an increase in the number of women citing atypical symptoms of heart disease, such as nausea.

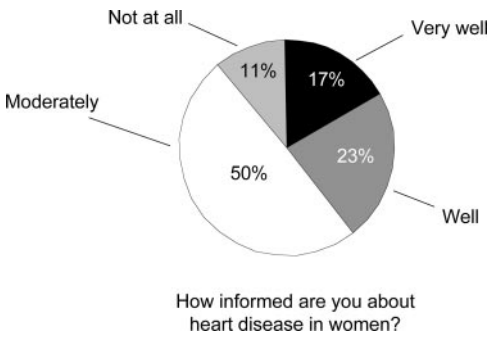

Figure 2. Knowledge and information about heart disease in women in 2003.

Perceptions of Heart Disease Risk Factors and Prevention

When asked to spontaneously identify the causes of heart disease, only a minority of respondents was able to name the major risk factors: 36% said smoking, 31% cited high cholesterol, 29% identified family history, 19% responded hypertension, and 7% stated diabetes. Although 31% of respondents acknowledged that high cholesterol is a cause

TABLE 4. Perceptions of Symptoms of Heart Attack and Stroke

	All Subjects		
Response (Unaided)	2003 (n=1024)	2000 (n=1004)	1997 (n=1000)
Heart attack			
Chest pain	62†	65	67
Pain: neck, shoulder, arm	59*	50	NA
Chest tightness	17	14	15
Shortness of breath	36*	30	33
Nausea	16*†	9	10
Fatigue	8*	5	8

All values are percentages.
*$P<0.05$ vs 2000.
†$P<0.05$ vs 1997.
Note: Only statistical comparisons are presented for 2003 vs 2000 and 2000 vs 1997.

TABLE 5. Perception of Heart Disease Prevention Strategies

	All Subjects		
Response (Aided)	2003 (n=1024)	2000 (n=1004)	1997 (n=1000)
Exercise	100*†	99	98
Lose weight	99†	98	97
Reduce stress	98	98	98
Quit smoking	98	97	98
Reduce dietary cholesterol	96	95	95
Reduce dietary salt	90	89	90
Reduce dietary animal products	79*†	84	90
Multivitamin	68†	66	50
Special vitamins (eg: E, C, A)	64†	65	59
Hormone therapy	29*†	54	47
Aromatherapy	29†	26	22

All values are percentages.
*$P<0.05$ vs 2000.
†$P<0.05$ vs 1997.
Note: Only statistical comparisons are presented for 2003 vs 2000 and 2000 vs 1997.

of heart disease, only 1% stated that high triglyceride level is a risk factor. Overweight status (41%) and lack of exercise (40%) were identified most often as risk factors for heart disease. White women aged 35 to 44 and 45 to 64 years were more likely than women in the other racial/ethnic and age groups, respectively, to correctly identify the major risk factors for heart disease (data not shown). Poor dietary habits were identified as a cause of heart disease by 26% of women, and stress was cited by 18% of women.

When asked whether a specific activity could reduce the risk of getting heart disease, almost all respondents (90% to 100%) recognized that engaging in physical exercise, losing weight, reducing stress, quitting smoking, and reducing dietary cholesterol and salt intake were important lifestyle measures (Table 5). Nontraditional methods to prevent CVD, such as vitamin consumption and aromatherapy, were more commonly cited in 2003 than in 1997. In contrast, fewer women cited postmenopausal hormone therapy (HT) and reducing dietary animal products as a method to prevent heart disease in 2003 than in 2000 and 1997.

Nearly 1 in 5 women (18%) indicated that they were aware of the results of the Women's Health Initiative (WHI).[6] When asked, the majority of respondents (63%) agreed that they were confused about how HT affects their overall health. Fewer women in 2003 said HT could help reduce their risk of heart disease than in 2000 (46% versus 63%; $P<0.05$) or in 1997 (56%; $P<0.05$). The vast majority of women (93%) agreed that it would be important to learn about preventive measures other than HT to lower their risk of heart attack and stroke.

Sources of Information About Heart Disease

About three fourths of women recalled seeing, hearing, or reading information about heart disease within the past 12 months, a significant increase from the rates in 2000 (78% versus 75%; $P<0.05$) and in 1997 (73%; $P<0.05$). Magazines, television, newspapers, healthcare providers, and the Internet were identified as the most common sources of this information. Magazines continue to be identified as an important recent source of information for about 50% of white women. Black women most commonly recognized television (41%) as a provider of healthcare information within the past year.

Nearly all women (93%) indicated that they were comfortable discussing preventive and treatment options with their healthcare providers, but relatively few (38%) had actually had a discussion about heart disease with their doctors. A significantly greater percentage of white women reported having had a discussion about heart disease with their doctor in 2003 compared with 1997 (40% versus 29%; $P<0.05$) in contrast to racial/ethnic minorities, where a decrease occurred.

Discussion

This national study documented several important trends. First, awareness of heart disease as the leading cause of morbidity and mortality in women has significantly improved over the past 6 years, and the perception that cancer is a more frequent cause of death relative to heart disease was reversed between 1997 and 2003. Despite the gain in awareness, only 13% of women cite heart disease as their greatest health problem, documenting that a paradox between actual risk and perceived health threats still exists. Awareness and knowledge of CVD have improved the least among those at highest risk. Although black women showed significant improvements in awareness of heart disease and stroke, it was to a lesser extent than white women. Awareness in Hispanic women lags behind that of both white and black women. A majority of women, particularly Hispanic women and those <45 years of age, feel uninformed about heart disease, and many women did not know specific levels of their risk factors, such as cholesterol. These data suggest there are important opportunities to educate women about CVD risk and prevention.

Information about women and heart disease has evolved considerably over the past 50 years. A review of AHA archival documents and information in the lay press shows that information from the 1950s to mid-1960s focused on how women could take care of the hearts of their husbands.[7] From the mid-1960s to the 1970s, information appeared relating to prevention, risk factors, and warning signs; however, the focus was primarily on men.[7] The present study shows that awareness and knowledge about heart disease affecting women has increased progressively from 1997 to 2003 among American women. Increased awareness and knowledge of heart disease was evident across all age groups, with a tendency for younger women to lag behind older women.

These findings are consistent with other survey data. In a postal study of female Stanford graduates, Pilote and Hlatky[8] found that 48% of those surveyed feared breast cancer most, compared with 16% who cited heart disease. Similarly, Lewis and colleagues[9] surveyed premenopausal women, age 35 to 49 years, and found respondents were more likely to overestimate

the risk of breast cancer than heart disease. The misperception about heart disease risk is particularly apparent at a young age. In a recent survey of 470 undergraduates at 2 universities, Green and colleagues[10] found that 68% of the respondents thought that their risk of heart disease was lower or much lower than that of their peers.

The present survey documents that women in the United States of all ethnic and age groups have suboptimal knowledge about CVD risk factors despite the fact that there are well-established methods to lower risk.[11,12] In the Nurses' Health Study, which monitored more than 80 000 women for 14 years, 82% of coronary events were attributed to lack of adherence to lifestyle guidelines involving diet, exercise, and smoking.[13] Furthermore, the most recent National Health and Nutrition Examination Survey, conducted between 1999 and 2000, found significant increases in the prevalence of obesity (30.1% with BMI $\geq$30 kg/m^2) and hypertension (34%) among women compared with prior surveys.[14,15] In addition, it is estimated that about 48% of women have elevated total cholesterol levels ($\geq$200 mg/dL) and that 21% smoke.[1]

Women at highest risk of heart disease showed the smallest improvement in risk factor identification since the last survey. Black and Hispanic women have higher prevalence rates of hypertension, obesity, physical inactivity, diabetes, and metabolic syndrome than do white women.[1] In the present survey, black women, in particular, were less aware that smoking, elevated cholesterol, and family history confer CVD risk. Similarly, in the Atherosclerosis Risk in Communities Study, fewer blacks than whites were aware of their cholesterol status. Although hypertension awareness was highest among black women, they were less likely to have their hypertension treated and controlled.[16] A recent telephone survey of individuals with diabetes found that 68% did not consider CVD to be a serious concern, and awareness of CVD risk was lowest among Hispanic and older patients.[17]

The present survey shows that women continue to obtain most of their information about heart disease from the mass media, a finding consistent with a 1995 telephone survey in which the mass media were the most commonly cited sources of information for stroke for both women and men.[18] Healthcare providers were cited as a source of information about heart disease by only 24% of women overall, compared with 45% for magazines, 34% for television, and 27% for newspapers.

The present study shows that opportunities for patient–physician discussions could be increased. Nearly all women surveyed indicated that they would be comfortable discussing preventive and treatment options about their health with their physician, but only a minority had ever done so. Our data correlate with a 1996 telephone survey in which only 41% of women reported that their physician had ever talked to them about heart disease.[19] Similarly, in a survey of 450 women undergoing coronary angioplasty at a university hospital, only 35% recalled previously being told that they were at risk for heart disease.[20] Physicians also report that discussions about CVD prevention occur in only a minority of office visits. In the 1995 National Ambulatory Medical Care Survey of more than 29 000 office visits, physicians reported offering counseling about physical activity, diet, and weight reduction in only a small proportion of these visits.[21]

The present study has several limitations. The survey included only households with telephones; therefore, women in low socioeconomic groups may have been excluded. Participants had to be English speaking to be included; therefore, results may not generalize to those who do not speak English. The method of randomly selecting households may have been biased to identify those with multiple telephone numbers. Because the study included 3 sequential surveys of different cohorts, individual change in knowledge and awareness could not be assessed.

In conclusion, since 1997, there has been a reversal in the perception that cancer is a more frequent cause of death than heart disease among women. Despite this trend, only half of women are aware that heart disease is their leading cause of death, and awareness among ethnic minorities at greatest risk lags behind whites. Our data suggest that intervention is needed to close this gap in awareness. The AHA, in collaboration with numerous organizations, has issued new guidelines for women from 20 years of age to optimize lifestyle and medical management of risk factors to reduce the burden of CVD.[22] Maximal implementation of these guidelines will require a continued emphasis on greater awareness of CVD in women among both healthcare providers and the public.

Acknowledgment

This survey was sponsored by a grant to the American Heart Association from Kos Pharmaceuticals.

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