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## Optimism, Cynical Hostility, and Incident Coronary Heart Disease and Mortality in the Women's Health Initiative

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### Abstract

**Background**—Trait optimism (positive future expectations) and cynical, hostile attitudes toward others have not been studied together in relation to incident coronary heart disease (CHD) and mortality in postmenopausal women.

**Methods and Results**—Participants were 97 253 women (89 259 white, 7994 black) from the Women's Health Initiative who were free of cancer and cardiovascular disease at study entry. Optimism was assessed by the Life Orientation Test–Revised and cynical hostility by the cynicism subscale of the Cook Medley Questionnaire. Cox proportional hazard models produced adjusted hazard ratios (AHRs) for incident CHD (myocardial infarction, angina, percutaneous coronary angioplasty, or coronary artery bypass surgery) and total mortality (CHD, cardiovascular disease, or cancer related) over  $\approx$ 8 years. Optimists (top versus bottom quartile [“pessimists”]) had lower age-adjusted rates (per 10 000) of CHD (43 versus 60) and total mortality (46 versus 63). The most cynical, hostile women (top versus bottom quartile) had higher rates of CHD (56 versus 44) and total mortality (63 versus 46). Optimists (versus pessimists) had a lower hazard of CHD (AHR 0.91, 95% CI 0.83 to 0.99), CHD-related mortality (AHR 0.70, 95% CI 0.55 to 0.90), cancer-related mortality (blacks only; AHR 0.56, 95% CI 0.35 to 0.88), and total mortality (AHR 0.86, 95% CI 0.79 to 0.93). Most (versus least) cynical, hostile women had a higher hazard of cancer-related mortality (AHR 1.23, 95% CI 1.09 to 1.40) and total mortality (AHR 1.16, 95% CI 1.07 to 1.27; this effect was pronounced in blacks). Effects of optimism and cynical hostility were independent.

**Conclusions**—Optimism and cynical hostility are independently associated with important health outcomes in black and white women. Future research should examine whether interventions designed to change attitudes would lead to altered risk.

### Keywords

cardiovascular diseases; mortality; women; hostility; optimism

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Evidence suggests that psychological factors influence risk for cardiovascular disease (CVD) morbidity and mortality. Persistent negative affect, such as depression, anxiety, or

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### Disclosures

None.

anger, and cynical, hostile attitudes toward others predict CVD.<sup>1–4</sup> Recently, research has investigated the health effects of low levels of positive attributes.<sup>5</sup> One attribute that has received particular attention is dispositional optimism, defined as the general expectation that good things, rather than bad things, will happen in the future.<sup>6</sup> Evidence shows, for example, that optimistic individuals have a lower risk of rehospitalization after bypass surgery<sup>7</sup> and are at reduced risk of mortality.<sup>8,9</sup>

Important gaps remain in understanding the role of psychosocial factors. These gaps include whether the associations between optimism and cynical hostility with CVD and mortality vary by race or ethnicity, because most of the evidence is based on white participants. Second, optimism and cynical hostility are inversely related<sup>10</sup> and have not been examined together extensively. Thus, it is not clear whether the effects are mirror images or whether they are independent of one another. Third, the link between incident coronary heart disease (CHD) and cynical hostility has been studied,<sup>11</sup> but not the link with optimism. The Women's Health Initiative<sup>12</sup> affords the largest sample to date to study health associations of optimism and cynical hostility prospectively in postmenopausal women. Our objectives were to determine the association of optimism and cynical hostility with a wide spectrum of cardiovascular risk factors, to assess the combined and independent influences of optimism and cynical hostility on incident CHD and mortality across 8 years of follow-up, and to evaluate associations by race/ethnicity.

## Methods

### Study Population

As described elsewhere, the Women's Health Initiative<sup>13</sup> recruited 161 809 postmenopausal women into a long-term clinical trial (CT; n=68 133) or an observational study (OS; n=93 676). Participants representing diverse race/ethnicity and socioeconomic backgrounds who were 50 to 79 years of age were recruited from 40 clinical centers in 24 states and the District of Columbia between September 1, 1994, and December 31, 1998. At the time of enrollment, women were excluded if they were not planning to reside in the area for at least 3 years; had a life expectancy of <3 years; had a substance abuse condition (other than current smoking or alcohol consumption), mental illness, or dementia; or were active participants in other randomized trials. Participants considered for the CT were further excluded if there was any history of invasive cancer in the previous 10 years; myocardial infarction, stroke, or transient ischemic attack in the previous 6 months; chronic hepatitis or cirrhosis; blood pressure >200/105 mm Hg; or if they were severely underweight, had low hematocrit or platelets, or were using corticosteroids.<sup>13</sup>

For the present analysis (n=97 253 women from both the CT and the OS), participants were also excluded if at study entry, they reported a history of prevalent cancer (excepting nonmelanomatous skin cancer) or CVD (defined as a history of stroke, myocardial infarction, angina, congestive heart failure, peripheral arterial disease, percutaneous coronary angioplasty, or coronary artery bypass graft), had a white blood cell count <2.5×10<sup>9</sup> or >15.0×10<sup>9</sup> cells/L, or did not identify themselves as white or black. All participants provided informed consent using materials approved by institutional review boards at each center.

### Measurement of Optimism and Hostility

Questionnaires that measured optimism and cynical hostility were administered to all participants at baseline. The Life Orientation Test–Revised measures optimism and contains 6 items. Item ratings are summed to yield a total score that ranges from 6 to 30 (higher scores indicate greater optimism, and lower scores indicate greater pessimism). Sample

questionnaire items were as follows: “In unclear times, I usually expect the best”; “If something can go wrong for me, it will.” Optimism scores were categorized into quartiles based on the sample distribution, with the following cutoffs: Highest ( $\geq 26$ ; “optimists”); mid-high (24–25); mid-low (22–23); and lowest ( $< 22$ ; “pessimists”).

Cynical hostility was assessed by the cynicism subscale of the Cook-Medley Questionnaire, which contains 13 true/false items, with higher scores indicating greater cynical hostility. Sample items are, “I have often had to take orders from someone who did not know as much as I did,” and “It is safer to trust nobody.” Cynical hostility scores were categorized into quartiles, with the following cutoffs: Most ( $\geq 6$ ); mid-high (4–5); mid-low (2–3); and least (0–1). In this sample, the correlation between optimism and hostility was  $r = -0.27$ ,  $P < 0.001$ , in blacks and whites and the full sample.

### Measurement of Other Baseline Characteristics

At the baseline examination, participants provided information on demographics, socioeconomic status, medical history, personal habits, reproductive history, hormone replacement therapy (HRT), and physical and laboratory measurements. Demographic data included age, self-reported race/ethnicity, residency region within the United States, education (less than a high school education, greater than high school but less than college, any college, or more than college), annual family income ( $< \$35\,000$ ,  $\$35\,000$  to  $< \$75\,000$ , or  $\geq \$75\,000$ ), current employment, and living arrangement (currently living alone). Medical information included health insurance, self-reported history of diabetes mellitus, hypertension (defined as a “yes” response to, “Do you currently take pills for high blood pressure?”) or an average blood pressure of 140/90 mm Hg or more with a standard protocol, and hypercholesterolemia (a “yes” response to, “Has a doctor told you that you have high cholesterol requiring pills?”). Depressive symptoms were assessed with the screening algorithm developed by Burnam and colleagues,<sup>14</sup> which produces a logistic regression equation (range of 0 to 1, with scores  $\geq 0.06$  indicating depressive symptoms). Religious service attendance was categorized as not at all, 1 to 3 times per month, or  $\geq 1$  time per week.

Personal habits included smoking and alcohol consumption (never, past, or current) and exercise (defined as the number of total metabolic equivalents per week based on energy expenditures from recreational activity divided into tertiles:  $< 2.5$ , 2.5 to  $< 18.25$ , or  $\geq 18.25$  metabolic equivalents). Reproductive history included parity (nulliparous, 1 to 3 live births, or  $\geq 4$  live births) and HRT use (categorized as current, past, or never on the basis of a series of questions that examined HRT use from pills or patches). Physical and laboratory measurements included waist circumference measured to the nearest 0.5 cm ( $< 88$  versus  $\geq 88$  cm), body mass index ( $< 30$  versus  $\geq 30$  kg/m<sup>2</sup>), and white blood cell count divided into quartiles (2.5 to 4.8, 4.81 to 5.6, 5.61 to 6.7, or 6.71 to  $15 \times 10^3$ /microliter). CT or OS status was a covariate because of differences in exclusion criteria used in the CT and OS.

### Measurement of CHD Morbidity and Mortality

Outcomes were adjudicated through 2005 according to a previously described protocol.<sup>15</sup> Outcome data for the OS participants were obtained annually via mailed medical history update questionnaires, direct contact while the subjects attended the clinical follow-up visit at years 1 and 3 of the study, or via proxy respondents. Participants in the CT had annual clinic visits. Incident CHD was defined as the composite end point of myocardial infarction, angina, percutaneous transluminal coronary angioplasty, and coronary artery bypass grafting.

National Death Index searches were performed to verify reports of participant fatalities. Two central adjudicators reviewed all deaths and were required to come to an agreement before a case was closed.<sup>15</sup> Total mortality was further categorized as CHD related, CVD related, or cancer related. The number of deaths due to other causes such as homicide, suicide, or accident/injury was too small to characterize by level of optimism and cynical hostility. A random sample of deaths was reviewed annually by the Cardiovascular Central Adjudication Committee. Mortality follow-up and adjudication approached 100%.

### Statistical Analysis

Descriptive statistics for all variables by race/ethnicity and level of optimism and cynical hostility were assessed by  $\chi^2$  analyses. We calculated age-adjusted incident CHD and mortality rates per 10 000 on the basis of 3 age groups (50 to <60, 60 to <70, and  $\geq$ 70 years old at study entry). Age adjustment was calculated by a direct method with the entire Women's Health Initiative population used as the standard population.

Cox proportional hazard models were used to estimate the adjusted hazard ratio (AHR) and 95% confidence intervals (CIs) for incident CHD and total mortality associated with level of optimism and level of hostility after adjustment for traditional risk factors (age, hypertension, high cholesterol, smoking, and diabetes mellitus),<sup>16</sup> psychosocial risk factors (education, income, and depressive symptoms),<sup>4,17</sup> alcohol use,<sup>18</sup> physical activity and body mass index,<sup>19</sup> use of HRT,<sup>20</sup> race/ethnicity,<sup>21</sup> and CT/OS status because of differences in exclusion criteria used in the CT and OS. All variables were categorical and met the proportional hazards assumption. Time in the proportional model was the follow-up time from enrollment to the event (for cases) or to the last contact for outcome information (for noncases). Noncases were censored at the end of their follow-up time. Loss to follow-up was extremely low (0.9% among CT participants and 0.4% among OS participants). Additional models explored the interaction of (1) optimism and cynical hostility, (2) optimism and race/ethnicity, and (3) cynical hostility and race/ethnicity for all outcomes.

Dr Tindle had full access to all of the data in the study and takes full responsibility for the integrity of the data and the accuracy of the data analysis.

## Results

### Distributions and Associations of Optimism and Cynical Hostility

Tables 1 and 2 show the number and percent of women according to approximate quartiles of optimism and cynical hostility scores (shown as most to least optimistic or hostile, respectively) on the basis of the sample distribution. Optimism scores were distributed similarly in whites and blacks (Table 1). In contrast, cynical hostility scores were distributed dissimilarly in whites and blacks (Table 2). Given these differences in baseline optimism and cynical hostility by race/ethnicity, subsequent analyses were performed separately in whites, blacks, and the full sample. Optimists (in quartiles) were less likely to be hostile ( $P$  for linear trend <0.0001), whereas pessimists were more likely to be hostile ( $P$  for linear trend <0.0001). This relationship was more pronounced in blacks, with >50% of the most pessimistic black women scoring in the highest category of hostility.

### Baseline Characteristics of Women According to Optimism and Cynical Hostility

Optimists (compared with pessimists) were more likely to be younger (this was more pronounced in blacks), to live in the western United States, to report higher education and income, to have employment and health insurance, and to attend religious services at least once per week. They were less likely to be classified as having diabetes mellitus, hypertension, high cholesterol, or depressive symptoms. Optimists were less likely to

smoke, to be sedentary, and to have a high body mass index or waist circumference. They reported a greater number of live births (observed in whites only) and greater current use of HRT (Table 1).

The most (compared with least) cynical, hostile women were less likely to live in the western United States and more likely to report lower education and lower income (especially among blacks), to lack health insurance, to have diabetes mellitus and depressive symptoms (especially among blacks), to be current smokers, to be sedentary, and to have a higher body mass index. They were more likely to report no prior use of HRT and to have a higher white blood cell count (Table 2).

### Age-Adjusted Rates of Incident CHD and All-Cause Mortality

In the full sample, age-adjusted incident CHD rates (per 10 000 women) increased in a stepwise fashion with decreasing levels of optimism, from 43 among optimists to 60 among pessimists ( $P$  for trend  $<0.0001$ ). Table I of the online-only Data Supplement portrays rates for white and black samples. (The full sample was omitted because the relatively large white sample closely reflected the full sample.) For cynical hostility, age-adjusted incident CHD rates decreased in a stepwise fashion with decreasing levels of hostility (from 56 events among the most cynical, hostile women to 44 events among the least;  $P$  for trend  $<0.0001$ ). Age-adjusted incident CHD rate differences by cynical hostility did not reach statistical significance in the black population.

Similar results were noted for the outcome of total mortality (online-only Data Supplement Table II). Rates of death (per 10 000 women) due to all causes increased in a stepwise fashion with decreasing levels of optimism (from 46 among optimists to 63 among pessimists;  $P$  for trend  $<0.0001$ ). This pattern was more striking among black women, in whom the death rate among optimists (versus pessimists) was 47 versus 85 ( $P$  for trend  $<0.0001$ ). Total mortality rates decreased with decreasing cynical hostility. Death rates among most (versus least) cynical, hostile women decreased from 63 to 46 ( $P<0.0001$ ). In blacks, the disparity between rates among most (versus least) cynical, hostile women appeared even more striking (87 versus 39 deaths,  $P<0.0001$ ). Differences in age-adjusted death rates between black and white women by level of optimism and hostility were statistically significant ( $P<0.05$ ).

We also examined optimism and hostility together as possible copredictors of age-adjusted rates of incident CHD and total mortality. The following trends emerged: At all levels of hostility, optimists (versus pessimists) had decreased rates of CHD and mortality. Similarly, at all levels of optimism, most (versus least) cynical, hostile women had increased rates of CHD and mortality.

### Multivariable Cox Proportional Hazard Models

In the full sample, optimists (compared with pessimists) had significantly reduced AHRs (Table 3) of all outcomes except cancer-related mortality. The AHR was reduced by 16% for incident myocardial infarction, 9% for incident CHD, 14% for death due to any cause, 30% for CHD-related mortality, and 24% for CVD-related mortality. When cynical hostility was added to these adjusted models, the pattern of results did not change. Race/ethnicity modified the association between optimism and total mortality ( $P=0.02$ ) and tended to modify the association for cancer-related mortality ( $P=0.09$ ). In black women, optimists (versus pessimists) had a 33% reduced hazard of total mortality and a 44% reduced hazard of cancer-related mortality, with no other outcomes being statistically related to optimism.

Cynical hostility was not independently related to incident myocardial infarction or CHD after adjustment (Table 3). Among most (versus least) cynical, hostile women, the hazard of

death due to any cause was increased by 16%, and the hazard of death due to cancer was increased by 23%. Race/ethnicity modified the associations for total mortality ( $P=0.05$ ) and cancer-related mortality ( $P=0.03$ ). These findings were more pronounced in black women: Most (versus least) cynical, hostile black women had a 62% increased hazard of death due to any cause and a 142% increased hazard of cancer-related mortality. These results remained unchanged after we controlled for optimism.

For comparison of optimism and cynical hostility with other standard risk factors, the adjusted hazard of total mortality was increased by 28% among women with hypertension (AHR 1.28, 95% CI 1.20 to 1.36), 78% among women with diabetes mellitus (AHR 1.78, 95% CI 1.60 to 1.97), and 223% among women who were current smokers (AHR 3.23, 95% CI 2.93 to 3.55). There were no significant interactions between optimism and cynical hostility for any of the outcomes.

## Discussion

Optimism is associated with a reduced incidence of CHD and total mortality. Mortality reduction appears to be driven by reduced CHD-related death in blacks and whites and additionally by reduced cancer-related mortality in blacks. Conversely, cynical hostility was associated with an increased risk of total mortality and cancer-related mortality. To the best of our knowledge, this is the largest study to report the association of optimism and reduced mortality (which persisted after adjustment for a number of important cofactors) in white and black women. The present findings confirm and extend prior research on optimism and reduced CHD-related and total mortality.<sup>8</sup>

Optimism was associated with a favorable profile and cynical hostility with an unfavorable profile of baseline risk factors for CHD and mortality, including measures of socioeconomic status, health conditions, personal habits, and physical and laboratory measurements. Nevertheless, the relationship between optimism and cynical hostility and important health outcomes persisted after adjustment for baseline risk factors. Optimism and hostility may influence physiology directly,<sup>22, 23</sup> perhaps by altering the time course of disease processes such as atherosclerosis,<sup>24,25</sup> or indirectly, by influencing health behaviors such as smoking or adherence to treatment regimens<sup>26</sup> or by modifying the risk of incident depression (previously shown to be reduced among optimists).<sup>27</sup> However, the present findings persisted even after adjustment for important health behaviors and depressive symptoms. Furthermore, the results likely represent a conservative estimate of the overall effects of optimism and cynical hostility, given the adjustment for proposed mediators including health behaviors and depressive symptoms.

Optimism and cynical hostility are known to be associated with perceived stress, coping ability, and social support. Optimists (compared with pessimists) tend to cope with adversity in healthier ways<sup>28</sup> and to build stronger social relationships.<sup>29</sup> In contrast, hostility may impair the stress-buffering effects of social support.<sup>30</sup> These processes may contribute to more frequent or more severe experiences of negativity in pessimistic<sup>23</sup> and hostile<sup>31</sup> individuals, which may in turn unfavorably alter cardiovascular physiology, such as blood pressure. Neural imaging studies suggest differential neural responses in optimists versus pessimists<sup>32</sup> and in hostile and nonhostile individuals.<sup>33</sup>

Optimism and cynical hostility were associated with somewhat larger total and cancer-related mortality effects in black women than in white women, and reasons for this are unclear. The study sample was limited by a relatively low prevalence of highly cynical, hostile white women and a relatively high prevalence of black women with high cynical hostility. Cynical attitudes toward others may be both realistic and adaptive in minority

groups with a long history of exposure to discrimination, representing an appropriate coping response. Nonetheless, there may be a physiological cost of such an adaptation. It is theoretically possible that physiological reactions to mental phenomena (such as hostile cognitions) were more pronounced in black women, thus leading to greater amplitude or longer time course of emotional responding, in turn producing greater neural, endocrine, or inflammatory physiological responses that facilitated greater disease burden. However, real-time physiological data are beyond the scope of the original Women's Health Initiative design.

The present study had several important strengths, including an all-female sample large enough to examine whites and blacks, adjudicated health outcomes, and inclusion of relevant cofactors. We used well-studied and validated measures of optimism and cynical hostility. The sample size allowed for simultaneous assessment of optimism and cynical hostility, and the prospective study design allowed for a reasonable follow-up time to assess important cardiovascular and other health outcomes.

If psychological attitudes such as optimism and cynical hostility matter for health, the extent to which they can be modified remains unclear. Prior behavioral trials have targeted type A behaviors,<sup>34</sup> mental stress,<sup>35,36</sup> and depression and social support<sup>37,38</sup> with mixed results. None targeted hostile or optimistic attitudes; although perhaps indirectly, these studies did modify psychological attitudes. Further research is needed to understand how and why optimism and cynical hostility affect health outcomes in women and how they develop in earlier stages of life, as well as to identify therapies to alter these attitudes in healthy ways.

#### CLINICAL PERSPECTIVE

Over time, practicing clinicians often become intimately familiar with aspects of their patients' personalities, including optimistic or cynical, hostile psychological attitudes. Optimism and cynical hostility also appear to be independent risk factors for important health outcomes, including mortality. Optimism and cynical hostility may affect the risks of physical disease via 2 main pathways: (1) Directly, by altering activation of the autonomic nervous system, hypothalamic-pituitary axis, or other stress-response systems, which may in turn speed up the process of diseases such as atherosclerosis; and (2) indirectly, by influencing health behaviors such as smoking, eating patterns/obesity, and adherence to treatment regimens. In this sample, the magnitude of the effects of optimism and cynical hostility was less than but similar to the effect of hypertension for total mortality. The fact that these psychological factors are potentially modifiable increases their clinical relevance, especially when clinicians consider populations at higher risk, such as blacks.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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is available at <http://www.ncrr.nih.gov/>. Information on “Re-engineering the Clinical Research Enterprise” can be obtained from <http://nihroadmap.nih.gov/clinicalresearch/overview-translational.asp>.

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Table 1

Number of Women (Column %) by Optimism Groups With Select Baseline Characteristics (n=97 253)

Baseline Variable	Most Optimistic (n=26 991)	Mid-High Optimistic (n=22 760)	Mid-Low Optimistic (n=24 029)	Least Optimistic (n=23 473)
Whites (n=89 259)	24, 723 (92)	21 017 (92)	22 180 (92)	21 339 (91)
Blacks (n=7994)	2268 (8)	1743 (8)	1849 (8)	2134 (9)
Age, y				
50–59	9939 (37)	7604 (33)	7952 (33)	8332 (35)
60–69	12 245 (45)	10 577 (46)	11 100 (46)	10 552 (45)
70–79	4807 (18)	4579 (20)	4977 (21)	4589 (20)
Region of the United States				
Northeast	5590 (21)	5173 (23)	6107 (25)	6702 (29)
West	8317 (31)	6402 (28)	6261 (26)	5365 (23)
Enrolled in OS	15 705 (58)	12 598 (55)	13 458 (56)	13 423 (57)
Socioeconomic profile				
Education: high school or less	3600 (13)	4144 (18)	5309 (22)	6823 (29)
Income <\$35 000	7610 (28)	7465 (33)	8575 (36)	10,473 (45)
Currently employed	11 132 (41)	8828 (39)	9038 (38)	9029 (38)
Currently insured	25 876 (96)	21 895 (96)	23 075 (96)	22 077 (94)
Currently living alone	6579 (24)	5636 (25)	6048 (25)	6603 (28)
No. of religious services attended: 1 or more per week	12 607 (47)	10 744 (47)	10 746 (45)	9555 (41)
Positive history of diabetes mellitus	895 (3)	888 (4)	1032 (4)	1400 (6)
Currently hypertensive	8999 (33)	8367 (37)	9104 (38)	9293 (40)
Current high cholesterol	2745 (10)	2555 (11)	2818 (12)	2994 (13)
Current depressive symptoms	963 (4)	1365 (6)	2046 (9)	5044 (21)
Current smoking	1532 (6)	1365 (6)	1560 (7)	2083 (9)
Any alcohol consumption	20 367 (75)	17 047 (75)	17 953 (75)	16 497 (70)
Exercise: <2.5 METS per week	5558 (21)	5184 (23)	5915 (25)	7131 (30)
No. of live births ≥4	7626 (28)	6708 (29)	6745 (28)	6358 (27)
Use of HRT	12 254 (45)	9990 (44)	10 336 (43)	9393 (40)
Physical and laboratory measurements				
Waist circumference ≥88 cm	9432 (35)	8546 (38)	9273 (39)	10 176 (43)
Body mass index ≥30 kg/m	7021 (26)	6364 (28)	6971 (29)	7870 (34)
White blood cell count 6.71 to 15 × 10(3)/ microliter (highest category)	6089 (23)	5423 (24)	5861 (24)	6337 (27)

All *P* values <0.0001. Only the most relevant categories of each baseline characteristic are displayed.

**Table 2**

Number of Women (Column %) by Cynical Hostility Groups With Select Baseline Characteristics (n=97 253)

Baseline Variable	Most Hostile (n=21 606)	Mid-High Hostile (n=22 218)	Mid-Low Hostile (n=27 362)	Least Hostile (n=26 067)
Whites (n=89 259)	18 587 (86)	20 246 (91)	25 591 (94)	24 835 (95)
Blacks (n=7994)	3019 (14)	1972 (9)	1771 (7)	1232 (5)
Age, y				
50–59	7404 (34)	7597 (34)	9674 (35)	9152 (35)
60–69	9763 (45)	10 264 (46)	12 441 (45)	12 006 (46)
70–79	4439 (21)	4357 (20)	5247 (19)	4909 (19)
Region of the United States				
Northeast	5431 (25)	5502 (25)	6594 (24)	6045 (23)
South	5940 (27)	5472 (25)	6510 (24)	5822 (22)
West	5170 (24)	5937 (27)	7612 (28)	7626 (29)
Enrolled in OS	12 355 (57)	12 530 (56)	15 521 (57)	14 778 (57)
Socioeconomic profile				
Education: high school or less	5763 (27)	4722 (21)	5002 (18)	4389 (17)
Income <\$35 000	9513 (44)	8043 (36)	8905 (33)	7657 (29)
Currently employed	8222 (38)	8684 (39)	10 986 (40)	10 135 (39)
Currently insured	20 221 (94)	21 249 (96)	26 277 (96)	25 176 (97)
Currently living alone	6040 (28)	5734 (26)	6858 (25)	6234 (24)
No. of religious services attended: 1 or more per week	9659 (45)	10 118 (46)	12 253 (45)	11 622 (45)
Positive history of diabetes mellitus	1354 (6)	1019 (5)	1024 (4)	818 (3)
Currently hypertensive	8817 (41)	8290 (37)	9790 (36)	8866 (34)
Current high cholesterol	2789 (13)	2653 (12)	3002 (11)	2668 (10)
Current depressive symptoms	3638 (17)	2232 (10)	2143 (7.8)	1405 (5.4)
Current smoking	1746 (8)	1550 (7)	1753 (6)	1491 (6)
Any alcohol consumption	14 731 (68)	16 474 (74)	20 664 (76)	19 995 (77)
Exercise: <2.5 METS per week	6281 (29)	5580 (25)	6427 (23)	5500 (21)
No. of live births ≥4	5985 (28)	6229 (28)	7856 (29)	7367 (28)
Use of HRT	8474 (39)	9375 (42)	12 246 (45)	11 878 (46)
Physical and laboratory measurements				
Waist circumference ≥88 cm	9830 (45)	8893 (40)	10 112 (37)	8592 (33)
Body mass index ≥30 kg/m	7692 (36)	6797 (31)	7486 (27)	6251 (24)
White blood cell count 6.71 to 15 × 10(3)/microliter (highest category)	5836 (27)	5482 (25)	6552 (24)	5840 (22)

All *P* values <0.0001. Only the most relevant categories of each baseline characteristic are displayed.

Table 3

Optimism, Cynical Hostility, and Fully Adjusted Hazard of Important Disease Outcomes\*

	Incident Myocardial Infarction	Incident CHD	All-Cause Mortality	CHD-Related Mortality	CVD-Related Mortality	Cancer-Related Mortality
Optimism (most vs least)						
White and black women (n=97 253)	0.84 (0.73–0.96)	0.91 (0.83–0.99)	0.86 (0.79–0.93)	0.70 (0.55–0.90)	0.76 (0.64–0.90)	0.93 (0.82–1.05)
Whites (n=89 259)	0.83 (0.72–0.95)	0.90 (0.82–0.99)	0.87 (0.80–0.96)	0.71 (0.55–0.93)	0.77 (0.64–0.92)	0.97 (0.85–1.10)
Blacks (n=7994)	1.01 (0.60–1.70)	0.96 (0.70–1.31)	0.67 (0.50–0.90)	0.62 (0.31–1.24)	0.69 (0.41–1.15)	0.56 (0.35–0.88)
Cynical hostility (most vs least)						
White and black women (n=97 253)	1.13 (0.98–1.30)	1.04 (0.95–1.13)	1.16 (1.07–1.27)	1.25 (0.98–1.60)	1.14 (0.95–1.35)	1.23 (1.09–1.40)
Whites (n=89 259)	1.14 (0.99–1.32)	1.06 (0.97–1.16)	1.13 (1.03–1.23)	1.18 (0.91–1.54)	1.12 (0.93–1.34)	1.18 (1.04–1.34)
Blacks (n=7994)	0.98 (0.52–1.82)	0.83 (0.59–1.18)	1.62 (1.14–2.31)	2.02 (0.77–5.27)	1.27 (0.67–2.42)	2.42 (1.34–4.39)

\* All models adjusted for age, race/ethnicity, education, income, diabetes mellitus, hypertension, high cholesterol, depressive symptoms, alcohol consumption, smoking, physical activity, HRT use, body mass index, and OS cohort vs CT status.