

# Abstract

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## A Randomized Factorial Trial of Vitamins C and E and Beta Carotene in the Secondary Prevention of Cardiovascular Events in Women – Results From the Women's Antioxidant Cardiovascular Study

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**BACKGROUND:** Randomized trials have largely failed to support an effect of antioxidant vitamins on the risk of cardiovascular disease (CVD). Few trials have examined interactions among antioxidants, and, to our knowledge, no previous trial has examined the individual effect of ascorbic acid (vitamin C) on CVD.

**METHODS:** The Women's Antioxidant Cardiovascular Study tested the effects of ascorbic acid (500 mg/d), vitamin E (600 IU every other day), and beta carotene (50 mg every other day) on the combined outcome of myocardial infarction, stroke, coronary revascularization, or CVD death among 8171 female health professionals at increased risk in a 2 x 2 x 2 factorial design. Participants were 40 years or older with a history of CVD or 3 or more CVD risk factors and were followed up for a mean duration of 9.4 years, from 1995-1996 to 2005.

**RESULTS:** A total of 1450 women experienced 1 or more CVD outcomes. There was no overall effect of ascorbic acid (relative risk [RR], 1.02; 95% CI, 0.92-1.13 [P = .71]), vitamin E (RR, 0.94; 95% CI, 0.85-1.04 [P = .23]), or beta carotene (RR, 1.02; 95% CI, 0.92-1.13 [P = .71]) on the primary combined end point or on the individual secondary outcomes of myocardial infarction, stroke, coronary revascularization, or CVD death. A marginally significant reduction in the primary outcome with active vitamin E was observed among the prespecified subgroup of women with prior CVD (RR, 0.89; 95% CI, 0.79-1.00 [P = .04]; P value for interaction, .07). There were no significant interactions between agents for the primary end point, but those randomized to both active ascorbic acid and vitamin E experienced fewer strokes (P value for interaction, .03).

**CONCLUSION:** There were no overall effects of ascorbic acid, vitamin E, or beta carotene on cardiovascular events among women at high risk for CVD.