Joann Manson, Frank Hu, et al.: A prospective study of walking as compared with vigorous exercise in the prevention of coronary heart disease in women. N Engl J Med 1999;341:650-8.

METHODS: The Nurses' Health Study was initiated in 1976, when 121,700 female registered nurses 30 to 55 years old who were residing in 11 large U.S. states completed a mailed questionnaire on their medical history and lifestyle. Every two years, follow-up questionnaires have been sent to obtain updated information on potential risk factors and to identify newly diagnosed cases of coronary heart disease or other illnesses. For the primary analyses in the present study, the base-line data were those gathered in 1986, when detailed information on physical activity was first collected, and the duration of follow-up was eight years. After women who reported a diagnosis of cardiovascular disease or cancer at base line were excluded, the population for analysis was made up of 72,488 women 40 to 65 years old in 1986.

Assessment of Physical Activity

Detailed information on physical activity was first collected in 1986 and was updated in 1988 and 1992. Participants were asked to report the average amount of time spent per week during the previous year in walking or hiking outdoors (including walking to work or while playing golf), jogging (at a speed slower than 10 minutes per mile [6 minutes per kilometer]), running (at 10 minutes per mile or faster), bicycling (including the use of a stationary bicycle), swimming laps, playing tennis or squash, or participating in calisthenics, aerobics, or aerobic dance; in addition, the women were asked to report the average number of flights of stairs they climbed each week. Women also reported their usual walking pace: easy or casual (<2.0 miles per hour [mph] [3.2 km per hour]), average (2.0 to 2.9 mph [3.2 to 4.6 km per hour]), brisk (3.0 to 3.9 mph [4.8 to 6.2 km per hour]), or very brisk (»4.0 mph [6.4 km per hour]). Using a standardized classification of the energy costs of physical activities, we calculated a weekly metabolic-equivalent (MET) score for total physical activity, vigorous activity (»6 MET per hour), non-vigorous activity (<6 MET per hour), and walking (2.5 to 4.5 MET per hour, depending on the pace). One MET is the caloric need per kilogram of body weight per hour of activity, divided by the caloric need per kilogram per hour at rest. Physical-activity scores were expressed as MET-hours per week. Validation of the questionnaire for assessing physical activity has been described previously in a similar cohort; the overall correlation between physical activities reported on the questionnaire and those recorded in four one week diaries was 0.62, and the correlation was 0.79 for activities reported on the questionnaire and those recalled after one week.

Ascertainment of End Points

The primary end points for this study were coronary events (defined as nonfatal myocardial infarction or death due to coronary disease) that occurred after the return of the 1986 questionnaire and before June 1994. We requested permission to review the medical records of women who reported a nonfatal myocardial infarction on a follow-up questionnaire. Study physicians who had no knowledge of the women's self-reported risk factors reviewed the records. Nonfatal myocardial infarction was confirmed if data in the medical records met World Health Organization criteria for this condition — namely, symptoms and either diagnostic electrocardiographic changes or elevated cardiac-enzyme levels. Myocardial infarctions that required hospital admission and for which confirmatory information was obtained by interview or letter but for which no medical records were available were designated as probable infarctions (and constituted 17 percent of all reported nonfatal infarctions). We included all confirmed and probable cases of infarction in the analyses because the results were the same whether probable cases were included or excluded.

Follow Up

Follow-up information for nonfatal infarction was obtained for more than 95 percent of the potential person-time of follow-up. Deaths were reported by family members or the Postal Service or were ascertained through state registries or the National Death Index. We estimate that follow-up for death was more than 98 percent complete.