

# MORBIDITY AND MORTALITY A WEEKLY REPORT

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## Effectiveness in Disease and Injury Prevention

### Public Health Focus: Physical Activity and the Prevention of Coronary Heart Disease

Coronary heart disease (CHD) is the leading cause of mortality in the United States; each year, CHD is newly diagnosed in approximately 1.5 million persons and accounts for an estimated \$47 billion in direct and indirect health-care costs (1). Multiple risk factors associated with CHD include genetic susceptibility, elevated serum cholesterol, low levels of high-density lipoprotein cholesterol, cigarette smoking, uncontrolled hypertension, obesity, diabetes mellitus, and physical inactivity (2). This report summarizes information about the potential efficacy and cost-effectiveness of physical activity promotion as a strategy for preventing CHD.

#### Efficacy and Attributable Risk

Mild to moderate levels of physical activity (e.g., walking, gardening, yardwork, and dancing) can help prevent CHD. In 1987, a review of 43 epidemiologic studies concluded that moderate to vigorous physical activity reduces risk for CHD (3). Two thirds of the studies documented a substantial inverse relation between physical activity and risk for CHD. In addition, the risk for CHD was increased nearly twofold for persons who were physically inactive (relative risk=1.9; 95% confidence interval=1.4-2.5), a level comparable to the relative risks associated with increased systolic blood pressure (2.1), cigarette smoking (2.5), and elevated serum cholesterol (2.4) (4). A subsequent meta-analysis (5) and results from other longitudinal studies (6) support the role of physical inactivity as a strong and independent risk factor for CHD.

Based on a national survey in 1985, 56% of men and 61% of women in the United States either never or irregularly engaged in physical activity (7). Specifically, 25% of men and 30% of women reported no leisure-time physical activity during the preceding month, and an additional 31% of men and women reported irregular physical activity. Of the 36% of men and 32% of women who were regularly active during leisure time, 8% of the men and 7% of the women reported participating in vigorous and intense activity (7).

An estimate of the population-attributable risk for CHD mortality associated with physical inactivity among a selected group of men from 1977 through 1985 was

### Coronary Heart Disease — Continued

14% (6). In comparison, the risk for hypertension was 20%, 13%; and for a positive family history of premature parental cardiovascular disease based on published studies and the U.S. death rate to estimate attributed to several risk factors for nine chronic diseases (8) it is estimated that a total of 205,254 deaths associated with CHD were attributed to engaging in physical activity—a number in excess of estimated deaths from obesity (190,456), and hypertension (171,121) but similar to the deaths from elevated serum cholesterol (253,194).

#### Cost-Effectiveness

Based on 1989 mortality estimates for CHD, the extrapolated cost-effectiveness of physical activity promotion is \$5.7 billion, among other risk factors for CHD, only elevated serum cholesterol (≥200 µg/dL) has a higher estimated cost (Table 1). A cost-effectiveness analysis estimate the health and economic implications of a physical activity promotion program for CHD was conducted using a model of two hypothetical populations: physically active and another (inactive) of 1000 men aged 35 years and older. The analysis was based on a 30-year period to observe differences in the occurrence of CHD, life expectancy, and quality-adjusted life expectancy. Physical activity was associated with 78 fewer CHD events and 138 quality-adjusted life-year gained, the total cost was \$11,313—amounts similar to the cost savings from physical activity promotion strategies (Table 2).

In Canada, a program promoting physical activity in a selected population aged after 12 years of operation (12). The program consisted of physical activity classes 2-3 times per week for 30-45 minutes. The program included gymnasium and exercise equipment also were made available. Per capita medical claims were lower in the intervention group than in the control site having no promotion of physical activity (12). For every dollar invested in the intervention program saved \$679 in medical claims per year, a return of 67.9 dollars per dollar invested.

Other examples of worksite-based programs have been estimated. For example, in a worksite-based program for 1000 employees, the estimated cost was \$100-\$400 per employee per year (13). The estimated cost per employee was \$100-\$400 per employee per year (13). The estimated cost per employee was \$100-\$400 per employee per year (13).

TABLE 1. Population attributable risk of coronary heart disease mortality and estimated societal costs, by selected risk factors — United States, 1985

Risk factor	Attributable risk (%) <sup>†</sup> (n=593,111)	Estimated societal costs (\$)
Physical inactivity	34.6	42.7
Obesity	32.1	
Smoking	25.0	
Hypertension	28.9	
Elevated serum cholesterol (≥200 µg/dL)		42.7

\* Source: Reference 8.

† Percentages cannot be summed because they are calculated independently for each risk factor.

‡ Costs include hospital, physician, and nursing services; medicines; and other health care services.

