

Physical Activity and Cardiovascular Disease

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Physical Activity and CVD

- Only 22% of adults report regular sustained physical activity of any intensity 30 min or more 5X per week.
- Behavioral Risk Factor Surveillance Study shows a sedentary lifestyle in 51-68% of persons-- percentage of adults reporting no leisure time physical activity ranges from 17.5% in Utah to 51.1% in Georgia, with 55% in California.
- Physical inactivity is more prevalent among women and men, among blacks and Hispanics than whites, and among older vs. young adults and among less vs. more affluent persons.

Trends in Physical Inactivity

- Among American youth 12-21 years of age, enrollment among physical activity classes declined from 42% in 1991 to 27% in 1997.
- Vigorous physical activity participation declined from 66% in girls and 79% in boys in grade 9 to 44% in girls and 68% in boys by grade 12.
- From 1988 to 1992, doubling in prevalence of white males reporting no physical activity from 13% to 25%.

Physical Activity and CVD and All-Cause Mortality

- Multiple prospective studies over past 35 years show a strong, consistent, and grade relation between lack of occupational and leisure-time physical activity and CVD events, CVD mortality, and all-cause mortality.
- Studies in London busmen showed the most active conductors had lower CHD risk than those who worked sitting at the wheel.

Physical Activity and Risk for CHD and Total Mortality (cont.)

- Paffenbarger showed among 17,000 male college alumni that those expending 2000 kcal/week or more had a 28% reduced risk of all-cause mortality over 12-16 years, with steady decline from 500-3500 kcal/week.
- Morris showed among 3,590 male civil servants a 3-fold higher incidence of fatal MI and sudden death among sedentary men vs. those who participated in vigorous sports.
- Finnish Twin Cohort study showed among 7925 men and 7977 women a RR=0.57 for death in those classified as conditioning exercisers or RR=0.71 for occasional exercisers.

Other Studies of Self-Reported Physical Activity and CHD

- Leon et al. (1997) studied 12,138 middle-aged men for 16 years; 29% lower CHD mortality and a 22% lower all-cause mortality for least vs. moderately active.
- Rosengren et al. (1997) studied 7142 men in Sweden aged 47-55 followed for 20 years ; RR=0.72 for CHD death and RR=0.70 for total mortality in most vs. least active.
- Rodriguez et al. (1994) showed in 8006 Japanese-American men aged 45-68 followed for 23 years RR=0.83 for CHD incidence and 0.74 for CHD mortality, which was attenuated after adjustment for other risk factors.
- Folsom et al. (1997) showed in 7459 US men and women aged 45-64 followed 4-7 years showed RR=0.73 for women and 0.82 for men for CHD incidence/SD increment in physical activity, risk factor-adjusted.

Measured Physical Fitness and CHD

- Blair et al. (1989) followed 10,224 men and 3,120 women for 8 years; RR=1.58 for men and 1.94 for women for all-cause mortality in those in lowest vs. highest fitness quintile.
- Ecklund et al. (1988) showed in 4276 men aged 30-69 followed 10 years RR for CVD mortality of 2.7 and CHD death 3.2 per 35 beats/min from submaximal treadmill testing.

Cardiovascular Benefits of Physical Activity

- In children and young adults, the Young Finns Study (n=2358 aged 9-24) showed level of physical activity positively related to HDL-C and negatively associated with triglycerides, apolipoprotein B, and insulin levels in males (but only triglycerides in females).
- Pawtucket Heat Study showed estimated maximal oxygen consumption and self-reported physical activity related to blood pressure, BMI, and HDL-C.
- Study of 3331 Japanese men showed frequency of physical activity related to HDL-C and number of risk factors-- those who exercised 1,2, and ≥ 3 days per week had 1.38, 1.19, and 0.99 risk factors.
- PEPI study showed in 851 post-menopausal women self-reported physical activity positive associated with HDL-C and inversely related to insulin and fibrinogen.

Assessment of Physical Activity and Fitness

- Direct Monitoring - requires behavioral observation or the use of mechanical or electronic devices, or physiologic measures such as calorimetry.
- Self-report techniques:
 - Diaries detail physical activity in a given period
 - Logs provide a record of specific activities
 - Recall surveys useful in large populations
 - Retrospective quantitative history
 - Global self-reports

Measurement of Physical Activity Intensity

- Intensity can be characterized using qualitative terms such as light, moderate, hard, or strenuous.
- Estimated energy expenditure can be calculated in metabolic equivalents (METs), a ratio of the metabolic rate during activity to resting metabolic rate:
 - Vigorous work-related activities (lifting heavy loads, heavy construction) 8.0
 - Jogging, running, cross-country skiing 8.0
 - Swimming, other vigorous water activities 6.0
 - Less strenuous home maintenance, gardening 5.0
 - Bowling, golf 3.5

Recommendations of 1996 NIH Consensus Conference

- All Americans should engage in regular physical activity at a level appropriate to their capacity, needs, and interests.
- Children and adults should set a goal of accumulating at least 30 min of moderate intensity physical activity on most and preferably all days of the week.
- For those with known cardiovascular disease, cardiac rehabilitation programs that combine physical activity with reduction in other risk factors should be more widely used.

Physical Activity for Secondary Prevention

- Consultation with a physician recommended before beginning a new physical activity program
- Walking is recommended mode of early activity, with gradual increases until 5-10 min continuous activity achieved, until condition has stabilized
- A symptom-limited exercise test should then be performed before a conditioning program is initiated, focused on large muscle groups, with a goal to build up 20-30 min at a time (increments of duration of 5 min/week). Exercise intensity should approximate 50-80% of the maximum oxygen capacity.

Physical Activity for Children: Guidelines Summary (NASPE)

- Elementary school-aged children should accumulate at least 30-60 min of age-appropriate physical activity on all or most days of the week.
- Encourage more than 60 minutes and up to several hours per day
- Some activity should be in periods of 10-15 min or more including moderate to vigorous physical activity (vigorous bouts with brief periods of rest and recovery)
- Extended periods of inactivity are inappropriate
- A variety of physical activities is recommended for elementary school-aged children