

of treatment for acute maxillary sinusitis may be warranted when used in conjunction with topical decongestants. Unfortunately, the study population included only adult male patients who were not from a family practice and who had variable symptoms and treatment based on radiographic findings. Since no studies have been done to show that antibiotics have any benefit in treating sinusitis, it is not surprising that 3 days is neither better nor worse than 10 days. This study also provides no information on comparison treatment of that subgroup of patients with typical signs and symptoms of acute sinusitis. For physicians who would treat patients with any suggestion of sinusitis, the study may provide justification to initially treat for 3 days and then provide longer treatment if this course fails. For physicians who try to be more selective in whom they treat, however, the use of antibiotics and length of time still remains a question, as does the use of decongestants.

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## PHYSICAL FITNESS AND MORTALITY

**TITLE:** Changes in physical fitness and all-cause mortality: a prospective study of healthy and unhealthy men  
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**Clinical question.** Is physical fitness related to mortality? If the answer is yes, can a change in fitness level influence the risk of mortality?

**Background.** Decreased physical fitness and physical activity have both been associated with increased mortality. While physical fitness can be measured objectively, physical fitness is usually subjectively reported. Most previous prospective studies of physical fitness and mortality have used a single baseline measure of fitness, then followed participants for mortality. Not accounting for confounding variables, such as smoking, or a change from the patient's baseline fitness status could make such a study difficult to interpret.

**Population studied.** Study participants were 9777 men who completed at least two preventive medicine examinations, including treadmill testing, at the Cooper Clinic in Dallas, Texas, from December 1970 through December 1989. Participants ranged in age from 20 to 82 years,

were predominantly white, and from middle to upper socioeconomic strata. All had achieved 85% of age-predicted maximal heart rate (220 minus age) during both treadmill tests. The group was further subdivided into a healthy and unhealthy classification. Healthy men (n=6819) had normal resting and exercising ECGs, and no history of myocardial infarction, stroke, diabetes, or hypertension. Unhealthy men (n=2958) had at least one of the conditions, the most common being hypertension (n=1733).

**Study design and validity.** Demographic and medical history information was collected by self-administered questionnaire. Participants underwent physical examination, anthropometry, blood pressure measurement, and fasting blood chemistry analyses. The exercise test tolerance, specifically treadmill test duration, was the measurement of physical fitness because it has previously been shown to have a high correlation with measured maximal oxygen uptake. Based on treadmill time, participants were characterized by fitness quintile, ie, consecutive 20th percentiles. The unfit category was defined as the least fit quintile, while "fit" referred to patients in the remaining four quintiles. The mean interval between the two examinations was 4.9 years (range 1 to 18 years), and the mean follow-up time for mortality was 5.1 years (range 1 to 18 years). Five-year follow-up time is standard for survival analysis. Follow-up and time between examinations were similar for healthy and unhealthy groups, and the time between examinations was factored into the analyses. Mortality was determined by means of the National Death Index. Official death certificates were also examined for determination of cardiovascular disease (CVD) as the cause of death.

**Outcomes measured.** The primary outcome measured was the all-cause, age-adjusted mortality rate calculated as deaths per 10,000 man-years. Other variables included in the multivariate analysis were baseline weight, resting blood pressure, serum cholesterol, fasting blood glucose, cigarette smoking, family history of heart disease, and health status (healthy or unhealthy).

**Results.** There were 223 deaths during the study period. Men who were unfit at both visits had the highest all-cause mortality rate, men who were fit at both visits had the lowest all-cause mortality rate, and men who changed fitness status had intermediate rates. Similar results were observed for the cardiovascular death rate. Within the "fit at both exams" group, a gradient of decreasing mortality was seen as men moved into the most fit quintiles. Improved physical fitness was associated with lower all-cause and CVD death in both healthy and unhealthy men. For each minute increased in treadmill time between the two

examinations, a reduction in risk of 7.9% for all-cause mortality among all men was found. When men within specific age groups who had improved their fitness level were compared with those who did not, an increase in fitness among men 60 years and older was associated with 50% lower death rates. Among men in the 20 to 39 year age range, a 70% reduction in the death rate was observed.

Does this mean that physical fitness is protective against AIDS, accidents, and violent deaths, which are some of the leading causes of death in this youngest age group? Probably not. It is likely that men who are concerned with their physical fitness are also less likely to engage in behaviors that would jeopardize their health, such as driving under the influence of alcohol.

**Recommendations for clinical practice.** The results say much for advising patients that it is never too late (or too early) to increase physical activity. One should keep in mind, though, that the study participants are a fairly select group of well-to-do men, which may limit the generalizability of the results. Also, although the authors controlled for some possible confounding variables (weight, smoking, blood pressure, serum glucose and cholesterol) that are associated with physical fitness and mortality, they did not inquire about

others such as alcohol or sexual habits. Because it is likely that physically fit men would avoid risky health behaviors in general, it is possible that the association between mortality and fitness could be explained by other variables not accounted for in the analysis.

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