

Low physical capacity second only to smoking as highest death risk

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A 45 year study in middle-aged men has shown that the impact of low physical capacity on risk of death is second only to smoking. The research is published today in the *European Journal of Preventive Cardiology*.

"The benefits of being physically active over a lifetime are clear," said lead author Dr Per Ladenvall, a researcher in the Department of Molecular and Clinical Medicine, Sahlgrenska Academy at University of Gothenburg, Sweden. "Low physical capacity is a greater risk for death than [high blood pressure](#) or [high cholesterol](#)."

The study included 792 [men](#) from the "Study of Men Born in 1913", a representative sample of 50 year old men in Gothenburg recruited in 1963. The study was designed to investigate risk factors for cardiovascular disease and mortality.

In 1967, at 54 years of age, the 792 men did an exercise test. Of those, 656 men also did a maximum exercise test in which they pushed themselves to the limit. The remaining men were excluded from the [maximum exercise](#) test because they had a health condition that could make it unsafe. Maximal oxygen uptake, called VO₂ max, was measured in a subpopulation of the 656 men using ergospirometry.

Dr Ladenvall said: "VO₂ max is a measure of aerobic capacity and the higher the figure, the more physically fit a person is. In 1967 it was difficult to do ergospirometry in large populations, so the researchers

derived a formula using the measurements in the subpopulation, and then calculated predicted VO₂ max for the remaining 656 men who had done the maximum [exercise test](#)."

After the initial examination in 1967, the men were followed up until 2012, at the age of 100 years. Several physical examinations were performed, about one every 10 years. Data on all-cause death was obtained from the National Cause of Death Registry.

To analyse the association between predicted VO₂ max and mortality the men were divided into three groups (tertiles) ranging from low to high: 2.00 l/min, 2.26 l/min, and 2.56 l/min.

The researchers found that each tertile increase in predicted VO₂ max was associated with a 21% lower risk of death over 45 years of follow up, and after adjusting for other risk factors (smoking, blood pressure and serum cholesterol).

Dr Ladenvall said: "We found that low aerobic capacity was associated with increased rates of death. The association between exercise capacity and all-cause death was graded, with the strongest risk in the tertile with the lowest maximum aerobic capacity. The effect of aerobic capacity on risk of death was second only to smoking."

"The length of follow up in our study is unique," continued Dr Ladenvall. "When this study began, most data was derived from hospital cohorts and there was very limited data on exercise testing in a large general population. Our sample is representative of the male population in Gothenburg at that time. The [risk](#) associated with low [aerobic capacity](#) was evident throughout more than four decades and suggests that being physically active can have a big impact over a lifetime."

He concluded: "We have come a long way in reducing smoking. The

next major challenge is to keep us [physically active](#) and also to reduce physical inactivity, such as prolonged sitting."

More information: Ladenvall P, Persson CU, Mandalenakis Z, Wilhelmsen L, Grimby G, Svärdsudd K, Hansson PO. Low aerobic capacity in middle-aged men associated with increased mortality rates during 45 years of follow-up. *European Journal of Preventive Cardiology*. DOI: [10.1177/2047487316655466](https://doi.org/10.1177/2047487316655466)

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