

Staying fit can cut your risk of heart attack by half

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Researchers use a treadmill and a special mask to measure a person's maximum oxygen uptake, which is considered an important measure of fitness. Credit: Geir Mogen/NTNU

Poor cardiorespiratory fitness could increase your risk of a future heart

attack, even if you have no symptoms of a lifestyle illness today, a new study has found.

"We found a strong link between higher fitness levels and a lower risk of heart attack and angina pectoris over the nine years following the measurements that were taken," says researcher Bjarne Nes, from the Norwegian University of Science and Technology's (NTNU) Cardiac Exercise Research Group (CERG).

The study results have been published in the *European Heart Journal*.

Half the risk

"Even among people who seem to be healthy, the top 25 per cent of the most fit individuals actually have only half as high a risk as the least fit 25 per cent," Nes says.

Between 2006 and 2008, CERG researchers measured the cardiorespiratory fitness of 4527 men and women who participated in the HUNT3 population-based health survey in Nord-Trøndelag. None of the subjects had cardiovascular disease, cancer or [high blood pressure](#), and most were considered to be at low risk of cardiovascular disease for the next ten years.

Nevertheless, 147 of the participants experienced heart attacks or were diagnosed with angina pectoris by 2017. These diseases signal that the coronary arteries in the heart are narrowed or completely blocked.

The researchers analysed the participants in groups based on their level of fitness in relation to others of the same age and gender. The risk proved to decline steadily as patient fitness increased. The correlation between fitness and cardiovascular risk also held after adjusting for other factors that differed between the most and least fit participants.

Gold standard for exercise testing

One of the greatest strengths of the study is that the test used maximum [oxygen uptake](#) to measure participant fitness. Earlier studies that have linked fitness level to disease risk in healthy populations have largely been based on less precise calculations of fitness, or on self-reported physical activity information.

"Maximum oxygen uptake is the most precise measure of fitness," explains Bjarne Nes.

Our body uses oxygen to drive metabolic processes that create energy for the muscles. Maximum oxygen absorption is simply the maximum amount of oxygen the body is able to absorb during physical activity. Heart, blood vessel and muscle functioning are all important for oxygen uptake.

"We know that patients with low oxygen uptake are at increased risk of premature death and cardiovascular disease. Our study shows that poorer fitness is an independent risk factor for coronary artery disease, even among healthy women and men who are relatively fit," says Nes.

So how fit should you be?

The study suggests that even a small increase in fitness can significantly improve health. For each increase of 3.5 fitness points, the risk of heart attack or angina decreases by 15 per cent.

"Our results should encourage people to use training as preventive medicine. A few months of regular exercise that gets you out of breath can be an effective strategy for reducing the risk of [cardiovascular disease](#)," says the study's first author, Jon Magne Letnes. He is a medical

doctor and doctoral candidate in CERG.

Even if you never get in such good shape that you can say you have optimal protection, the study shows that participants' risk was lower the more fit they were.

"There is apparently no upper limit for training when it comes to the beneficial effects for the heart," writes British Professor Sanjay Sharma in a commentary accompanying the NTNU study.

Sharma's positions include that of medical director of the London Marathon, and he is considered one of the world's foremost experts in sports and heart disease.

Not just about exercise habits

To measure maximum oxygen uptake accurately, you have to breathe into a mask while running on a treadmill, where the speed increases or the incline gets steeper every minute. As you work at higher and higher intensity, your body needs more and more oxygen. The test ends when you can't run anymore, or when measurements show that the oxygen uptake is no longer increasing even though the treadmill speed is.

But why does the fitness number mean so much for your future health? "Fitness isn't just a measure of how much you've trained in your life, but it also tells you what kind of genes you have. Other factors like obesity may also affect fitness. So we measure a lot of the body's functions, and from other studies we know that both genes and physical activity play a role in how your [heart](#) and blood vessels function," says Letnes.

Test your fitness

We can't do much about our genes, but we can change our exercise habits. Letnes believes it may be useful for doctors to use fitness measurements when assessing their patients' health risks.

"Fitness testing can motivate patients to get into better shape over time, and it focuses on health promotion rather than on illness. Although it may be inconvenient and difficult to measure [oxygen](#) uptake at the doctor's office, some simple and relatively accurate calculators exist that can provide a good estimate of fitness and disease risk," he says.

CERG has developed just such a fitness calculator, which is currently recommended by US health authorities. More than six million people have found their fitness numbers with this [fitness](#) tool. The calculator is found at <https://www.ntnu.edu/cerg/vo2max>

More information: Jon Magne Letnes et al, Peak oxygen uptake and incident coronary heart disease in a healthy population: the HUNT Fitness Study, *European Heart Journal* (2018). [DOI: 10.1093/eurheartj/ehy708](#)

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