

A magic number for heart health

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Imagine being able to calculate one number that would tell you just how fit you are – and what that means for your heart health. Researchers from the Norwegian University of Science and Technology (NTNU) has managed exactly that: they have developed a model that can help doctors – and individuals – determine just how fit an individual is, and what that means for overall health.

Scientists at NTNU's newly established KG Jebsen Centre of Exercise and Medicine, led by Professor Ulrik Wisløff, have assembled the largest dataset of its kind in the world on fitness in healthy women and men. Using the database, the researchers were able to develop a model that enables the calculation of maximum oxygen uptake (VO₂max), which is the single best way to measure physical conditioning and cardiac health.

5000 Norwegians provide data

Until now, there has been relatively little information to describe the levels of fitness that could be expected in a healthy adult population. That led Wisløff and his colleagues at the Jebsen Center to look at how fitness is related to traditional [risk factors](#), by testing approximately 5000 healthy Norwegians aged 13-90 years.

The researchers found that women's and men's fitness (oxygen uptake) was 35 mL / kg / min and 45 mL / kg / min, respectively. This figure dropped by about 5% for each decade of increasing age for both sexes. For example, women in their 20s had a VO₂max on average of 45 mL /

kg / min, by the time a woman reaches her 50s, that number was closer to 34 mL / kg / min.

Women and men who had lower fitness (regardless of age) than the average for their gender were respectively 5 and 8 times more likely to have many risk factors for cardiovascular disease compared with those who had fitness values higher than average.

Conditioning a continuous measure of health status

The researchers also found that conditioning seems to reflect a continuous measure of health status, and that just a 5 mL / kg / min decrease in oxygen consumption was associated with an approximately 60% higher chance of having a collection of several risk factors for cardiovascular disease. The study confirms that a person's physical condition is even more important for [heart health](#) than previously thought.

The research group is now pursuing the cellular, molecular and genetic causes of good and poor conditioning. Since conditioning has such an effect on an individual's overall health, researchers believe that identifying these factors may lead to new approaches for new and more effective medicines in the treatment of lifestyle diseases such as cardiovascular disease, obesity and diabetes. The researchers believe that based on a single blood sample, it could be possible to design effective exercise program that suits an individual's genetic make-up and that makes it possible to prevent or delay the development of [cardiovascular disease](#).

One workout a week is enough to start

"It could be the same as just writing a prescription for medicine, except

in this case it could be number of workouts per week," Wisløff says. "And what is even more encouraging is that our research shows that the workouts don't have to be onerous to have an effect. For people who are in poor shape, just one 15 minute workout per week is enough to make a difference. Even parents with children should be able to manage that."

The key, however, is that that one workout must involve a high intensity session of 4 minutes where the heart is working at up to 90 per cent of its capacity, Wisløff's research has shown. A 10-minute warmup should precede this high-intensity portion of the workout session, and the high-intensity session should also be followed by a 3 minute cool down.

Scientists at the K.G. Jebsen Centre of Exercise in Medicine are currently conducting clinical trials of this approach in many different patient groups. The group was the first in the world to have clearly isolated heart cells from humans and has contributed to the mapping of cellular and molecular characteristics of heart cells from individuals with and without heart failure. This has led to the discovery of new mechanisms behind heart disease. The researchers are now conducting animal studies to examine how altering these mechanisms might reduce the rate of cardiovascular complications in individuals with heart disease.

Provided by Norwegian University of Science and Technology

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