

Risk factors of type 2 diabetes and CVD accumulate in children with poor aerobic fitness

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Risk factors of type 2 diabetes and cardiovascular disease accumulate in children who have poor aerobic fitness, a new study from the University of Eastern Finland shows. The study also found that the traditional way of expressing aerobic fitness in proportion to total body mass overestimates the role of aerobic fitness in identifying children at an increased risk of these diseases.

The study was conducted as part of the Physical Activity and Nutrition in Children (PANIC) Study at the University of Eastern Finland, and the findings were reported in the *Scandinavian Journal of Medicine & Science in Sports*.

The study determined threshold values of [aerobic fitness](#) for girls and boys, making it possible to identify [children](#) who are at an increased risk of [type 2 diabetes](#) and [cardiovascular disease](#). Altogether 352 Finnish children, aged between 9 and 11, were included in the current analyses. Their aerobic fitness was determined by measuring

peak oxygen uptake during a maximal exercise test. In addition, their body adiposity and skeletal muscle mass were measured by bioelectrical impedance. The researchers also calculated variables indicative of the risk of type 2 diabetes and cardiovascular disease, such as waist circumference, blood levels of insulin, glucose, HDL cholesterol, and triglycerides as well as blood pressure.

Aerobic fitness can be determined in many different ways in both children and adults. Often, aerobic fitness is determined by dividing the aerobic fitness measure obtained from an exercise test by total body mass that includes adipose tissue. This way, the calculated measure describes not only aerobic fitness but also body adiposity or fatness, which may lead to erroneous interpretations of the association of aerobic fitness with the risk of type 2 diabetes and cardiovascular disease.

The newly published study now shows that children with poor aerobic fitness in proportion to their total body mass have a significantly higher risk of type 2 diabetes and cardiovascular disease than their peers with better aerobic fitness. When aerobic fitness was proportioned to skeletal muscle mass, the association of aerobic fitness with the risk of type 2 diabetes and cardiovascular disease remained, but was considerably weaker than when proportioned to total body mass.

"Measures of aerobic fitness that are based on total body mass are better at predicting the [risk](#) of type 2 [diabetes](#) and cardiovascular disease than measures that are based on skeletal muscle mass; however, they exaggerate the role of aerobic fitness in children's health. We should be cautious when interpreting aerobic [fitness](#) measures that are proportioned to total body mass in order to correctly identify children who truly need health and lifestyle intervention," said Dr. Agbaje of the University of

Eastern Finland, the first author of the study.

More information: Andrew O. Agbaje et al, Peak oxygen uptake cut-points to identify children at increased cardiometabolic risk - The PANIC Study, *Scandinavian Journal of Medicine & Science in Sports* (2018). [DOI: 10.1111/sms.13307](https://doi.org/10.1111/sms.13307)

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