

# Highly fit teenagers coped better with COVID-19 later in life

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Of the Swedish men in their late teens who performed well in the physical fitness tests for military conscription, a relatively high proportion were able to avoid hospital care when they became infected with COVID-19 during the pandemic up to 50 years later. This has been shown by University of Gothenburg researchers in a register study, with

results now published in the *BMJ Open*.

The study is based on the Swedish Conscription Register, which contains particulars of over 1.5 million young Swedish men who began their military service in the years 1969–2005. Almost all of these men then underwent both a bicycle test and a [strength](#) test. Some 2,500 of the men included in the Conscription Register were later, in spring 2020, hospitalized with COVID-19.

## **Merging of registers**

For their study, the scientists divided the men into three groups based on their results in the fitness and strength tests. The data were merged with three other Swedish registers: the National Inpatient Register (IPR, also known as the Hospital Discharge Register), Intensive Care Register, and Cause of Death Register. The findings show a clear association between fitness and strength in youth and the risk of needing [hospital care](#) for COVID-19 infection 15–50 years after conscription.

"At the [population level](#), we can see that both good fitness and good muscle strength in the late teens are protective factors for severe COVID. For those with good fitness at the time of conscription, the risk of dying in spring 2020 was half as high as for the least fit. For those whose strength was good back then, too, we see a similar protective effect," says Agnes af Geijerstam, Ph.D. student at the University of Gothenburg's Sahlgrenska Academy, who is the lead author of the study.

However, since the oldest men in the study had not reached age 70, deaths from COVID-19 were uncommon in the study.

## **Protective effect irrespective of overweight**

The Conscription Register also contains data on the young men's height and weight.

"Previous studies have shown that obesity is a risk factor for severe COVID. But we see that good fitness and strength are [protective factors](#) for everyone, including men with overweight or obesity," says Professor Lauren Lissner, senior coauthor of the study.

Moreover, the study showed a link between the men's height to the risk of COVID-19 infection.

"The taller the men were, the greater their risk of needing advanced care when they had gotten COVID; but per centimeter this increase in risk is very small. Also, unlike fitness and strength, there is no way to influence our height" af Geijerstam says.

## **Boosting the immune system**

There have already been many studies showing the protective effect of good physical fitness in numerous medical conditions, including infections. It has been established that the immune system is strengthened and the propensity to inflammation is reduced by physical activity. Fitness in adolescence is also likely to be associated with active and otherwise healthy lifestyles throughout adult life.

"It's interesting to see that the high [fitness](#) and strength levels those men had so many years ago can be linked to protection against severe COVID. Today, young people are becoming ever more sedentary, and that means there's a risk of major problems arising in the long term—including a reduced resistance to future viral pandemics. Children and adolescents must get ample scope to move around," af Geijerstam says.

**More information:** Agnes af Geijerstam et al, Fitness, strength and severity of COVID-19: a prospective register study of 1 559 187 Swedish conscripts, *BMJ Open* (2021). [DOI: 10.1136/bmjopen-2021-051316](https://doi.org/10.1136/bmjopen-2021-051316)

Provided by University of Gothenburg

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