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Cardiorespiratory and muscular fitness in Swedish adolescents

Submission date 01/10/2026	**Recruitment status** Recruiting	[X] Prospectively registered [_] Protocol [_] Statistical analysis plan [_] Results [_] Individual participant data [X] Record updated in last year
Registration date 02/10/2026	**Overall study status** Ongoing	
Last Edited 02/10/2026	**Condition category** Other	

Plain English summary of protocol

Background and study aims

There is growing concern that today's adolescents may have lower physical fitness levels than previous generations. Physical fitness, including cardiorespiratory fitness and muscular strength, is strongly linked to current and future physical and mental health. Despite this, Sweden currently lacks nationally representative data on the fitness levels of adolescents and how these levels vary across different groups.

The SWEFIT study aims to establish national reference values for cardiorespiratory fitness and muscular strength among Swedish adolescents aged 13–14 and 17–18 years. The study will also examine differences in fitness according to sex and socioeconomic background, investigate associations between fitness, lifestyle habits, and mental health, and compare current fitness levels with previous Swedish and international data.

Who can participate?

Students enrolled in grade 7 (aged 13–14 years) and grade 2 of upper secondary school (aged 17–18 years) at participating schools in Sweden are eligible to participate. Participating schools are selected by Statistics Sweden (SCB) using a nationally representative sampling procedure to ensure broad geographic and socioeconomic representation of Swedish adolescents. Participation is voluntary. Students aged 15 years and older will provide their own informed consent, while parents or guardians will provide consent for participants younger than 15 years.

What does the study involve?

Data collection will take place at participating schools using buses equipped with testing equipment, nearby universities, or fitness centers. Students will attend a testing session with their class and rotate through several assessment stations supervised by trained research staff. Testing is expected to take 120–190 minutes per class.

The study includes:

1. A submaximal cycle ergometer test to estimate cardiorespiratory fitness.
2. Muscle strength tests, including handgrip strength, standing long jump, and bent-arm hang.
3. Measurements of height, weight, blood pressure, and resting heart rate.
4. A digital questionnaire covering physical activity, sedentary behaviour, dietary habits, sleep, tobacco and nicotine use, mental health, and background characteristics.
5. Information on parental education and household income obtained from registers maintained

by Statistics Sweden (SCB) to assess socioeconomic background.
All measurements are collected on one occasion, and no intervention or treatment is provided as part of the study.

What are the possible benefits and risks of participating?
The study will also contribute important knowledge about the health and fitness of Swedish adolescents, which may help inform future public health initiatives and policies.
The study involves only low-risk procedures. Some participants may experience temporary fatigue or mild discomfort during the fitness tests, particularly during the cycling test and muscle strength assessments. Participants can stop testing at any time if they wish.

Where is the study run from?
The study is led by researchers at the Swedish School of Sport and Health Sciences (GIH) in Stockholm, Sweden, in collaboration with Karolinska Institutet.

When is the study starting and how long is it expected to run for?
October 2026 to December 2029

Who is funding the study?
Skandia Idéer för livet (Sweden)

Who is the main contact?
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Study information

Scientific Title
The SWEFIT study: a national survey of cardiorespiratory and muscular fitness in Swedish adolescents

Acronym
SWEFIT

Study objectives
1. To establish nationally representative reference values for physical fitness (cardiorespiratory fitness and muscular strength) among Swedish adolescents aged 13–14 and 17–18 years
2. To investigate differences in physical fitness according to sex and socioeconomic background
3. To examine associations between physical fitness and health-related outcomes, including physical activity, sedentary behaviour, diet, sleep, tobacco use, and mental health
4. To compare current physical fitness levels with previous Swedish and international reference data

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 13/04/2026, Swedish Ethical Review Authority (Box 2110, Uppsala, 75002, Sweden; +46 (0)104750800; registrator@etikprovning.se), ref: Dnr 2026-01911-01

Primary study design
Observational

Secondary study design
Cross sectional study

Study type(s)

Health condition(s) or problem(s) studied
Physical fitness (cardiorespiratory fitness, muscular strength), resting heart rate, and blood pressure, height, weight, physical activity, sedentary behaviour, lifestyle factors, and mental health among Swedish adolescents

Interventions

This is a national cross-sectional observational study including approximately 4,000 Swedish adolescents aged 13–14 years (grade 7) and 17–18 years (grade 2 of upper secondary school) from approximately 80 schools across Sweden. Schools are selected by Statistics Sweden (SCB) to provide a geographically and socioeconomically representative sample of Swedish adolescents.

Participants attend a school-based assessment session conducted by trained research staff. Anthropometric measurements including height and weight are collected using standardized procedures. Resting heart rate and blood pressure are measured following a period of seated rest.

Cardiorespiratory fitness is assessed using the Ekblom-Bak submaximal cycle ergometer test. Muscular fitness is assessed using a battery of field-based tests, including standing long jump, handgrip strength and bent-arm hang.

Participants complete a digital questionnaire covering demographic characteristics, socioeconomic factors, physical activity, sedentary behaviour, dietary habits, sleep, tobacco and nicotine use and mental health. Mental health outcomes include anxiety symptoms, depressive symptoms, psychosomatic symptoms, life satisfaction and health-related quality of life.

Register-based information on parental education and household income is obtained from Statistics Sweden (SCB) and linked to study data using personal identity numbers before the data are pseudonymised for analysis.

All measurements are collected once during the study period, and no intervention is provided. The study aims to describe levels of physical fitness, health and lifestyle behaviours among Swedish adolescents and to investigate associations between these factors and socioeconomic characteristics.

Intervention Type
Other

Primary outcome(s)
1. Cardiorespiratory fitness measured using estimated maximal oxygen uptake (VO2max) assessed using the Ekblom-Bak submaximal cycle ergometer test at baseline

2. Muscular strength measured using handgrip strength, standing long jump, and bent-arm hang at baseline

Key secondary outcome(s)
1. Lifestyle habits (physical activity and sedentary behaviour, dietary intake, and tobacco/snus use) measured using self-reported questionnaire at baseline

2. Mental health measured using anxiety (Spence Children's Anxiety Scale - Short Version [SCAS-S]), depression (Patient Health Questionnaire –8 [PHQ-8]), psychosomatic problems (Health Behaviour in School-aged Children Symptom Checklist [HBSC-SCL]), life satisfaction (Cantril Ladder) and health-related-quality of life (KIDSCREEN-10) at baseline

3. Resting systolic and diastolic blood pressure and resting heart rate measured using automated devices at baseline

4. Anthropometric measures: body weight (kg) measured using a calibrated digital scale, height (cm) measured using a portable stadiometer, and body mass index (BMI, kg/m²) calculated from measured height and weight at baseline

5. Resting heart rate (beats per minute) and systolic and diastolic blood pressure (mmHg) measured using an automated blood pressure monitor after a period of seated rest at baseline

Completion date
31/12/2029

Eligibility

Key inclusion criteria
1. Students enrolled in grade 7 (aged 13–14 years) or grade 2 of upper secondary school (aged 17–18 years) at participating schools in Sweden
2. Provision of informed consent by participants aged 15 years or older, or parental/guardian consent for participants younger than 15 years
3. Ability to understand the study information and complete study procedures

Healthy volunteers allowed
Yes

Age group
Mixed

Lower age limit
13 Years

Upper age limit
18 Years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. Students outside the target age groups (13–14 years and 17–18 years)
2. Students attending schools not selected for participation in the study
3. Students unable to understand study information in Swedish sufficiently to provide informed consent and complete study procedures
4. Students or guardians who do not provide informed consent

Date of first enrolment
02/10/2026

Date of final enrolment
28/12/2028

Locations

Countries of recruitment
Sweden

Sponsor information

Organisation
Skandia's Ideas for Life Foundation

Funder(s)

Funder type

Funder Name
Skandia's Ideas for Life Foundation

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available