

# INPLASY PROTOCOL

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Authors declare that they have  
no conflicts of interest  
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review.

## INTRODUCTION

**Review question / Objective:** Is objectively measured vigorous-intensity physical activity associated with health-related outcomes in youth?

**Condition being studied:** Most exercise-related research in youth has been focused

## Objectively measured vigorous-intensity physical activity and its association with health-related outcomes in youth

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**Review question / Objective:** Is objectively measured vigorous-intensity physical activity associated with health-related outcomes in youth?

**Condition being studied:** Most exercise-related research in youth has been focused on moderate to vigorous physical activity and there is less evidence for a link between vigorous physical activity and health outcomes in this population. To date, only a limited number of longitudinal studies have analyzed its associations in youth, showing inconsistent results.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 22 June 2020 and was last updated on 22 June 2020 (registration number INPLASY202060082).

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## METHODS

**Participant or population:** Generally healthy population aged 3 up to 18 years (mean age).

**Intervention:** None.

**Comparator:** None.

**Study designs to be included:** Prospective cohort studies.

**Eligibility criteria:** To be eligible for inclusion in the meta-analysis, studies needed to meet the following criteria: (i) exposure: objectively measured VPA (e.g., accelerometers, heart rate monitors or similar); (ii) population: youth aged 3 up to 18 years at baseline (mean age); and (iii) outcomes: health-related factors, including adiposity, cardiometabolic outcomes, bone outcomes and/or health-related physical fitness; (iv) study design: observational prospective cohort studies.

**Information sources:** The search will be performed independently by two authors in the electronic databases MEDLINE, EMBASE and SPORTDiscus and restricted to published articles in the English and Spanish languages.

**Main outcome(s):** Adiposity (e.g., body mass index, body fat, waist circumference), cardiometabolic outcomes (e.g., cardiometabolic risk score, blood pressure), bone outcomes (e.g., total body bone mineral density and bone mineral content) and/or health-related physical fitness (e.g., cardiorespiratory fitness, muscular fitness).

**Quality assessment / Risk of bias analysis:** The risk of bias will be assessed by the Quality Assessment Tool for Observational Cohort and Cross-sectional Studies. The methodological tool comprised 14 items classified as “yes”, “no” or “not reported”. One author will conduct the risk of bias assessment and this will be re-examined by another co-author.

**Strategy of data synthesis:** We will use the correlation coefficient ( $r$ ) as the main effect size for the present study. Correlation coefficients will be pooled if outcomes will be reported by at least three studies, using DerSimonian-Laird random effects models. Separate pooled analyses will be conducted on the following parameters based on the available data: overweight/obesity, BMI, waist circumference, body fat, fat mass index, cardiometabolic risk score, systolic blood pressure, cardiorespiratory fitness, total body BMD, lumbar spine BMD and femoral neck BMD. Also, we will determine an overall effect on adiposity parameters using the following hierarchy: (1) body fat measured by dual energy X-ray absorptiometry; (2) body fat measured by skinfolds thickness; (3) body fat measured by bioelectrical impedance analysis; (4) waist circumference; and (5) BMI and overweight/obesity.

**Subgroup analysis:** Random-effects meta-regression analyses using method of moments will be estimated to independently evaluate whether results will be different by length of follow-up (months), and a subgroup analysis will be conducted considering the level of vigorous physical activity at baseline (<10 minutes per day or  $\geq 10$  minutes per day).

**Sensitivity analysis:** Sensitivity analysis will be performed to determine whether any single study with extreme findings had an undue influence on the overall results.

**Language:** English.

**Country(ies) involved:** Spain; Chile.

**Keywords:** High-intensity physical activity; bone health; cardiometabolic health status; obesity.

**Contributions of each author:**

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