

# THE ROLE OF PHYSICAL ACTIVITY IN THE PREVENTION OF CHILDHOOD OBESITY

## Why physical activity?

**Regular physical activity (PA) can improve physical fitness; improve heart, vascular and metabolic health, and bone health; and reduce adiposity in children and adolescents.** Being active can also improve cognitive function, including academic performance and mental health, and can reduce symptoms of depression and anxiety. One of the main contributors to childhood obesity is insufficient PA, alongside unhealthy eating habits. Obesity frequently persists into adulthood, accompanied by other detrimental effects on health. Concern for children's physical fitness and obesity has become increasingly urgent with the COVID-19 lockdown restrictions.



## STOP project findings: Mini-summary

- **Active travel (AT):** A systematic literature search found that interventions focused on increasing active travel for school journeys were successful in primary age children. There was a lack of evidence to make conclusions for adolescents. (1)
- **School-based PA interventions:** A systematic literature search found that interventions focusing on physical fitness and physical activity are most effective. Raising awareness of the risks of sedentary behaviour did not produce an added effect. Preliminary evidence points to lower effectiveness of PA interventions among socially deprived children. (2)
- **Physical education interventions:** Based on the Slovenian Healthy Lifestyle Intervention, additional physical education (PE) in school results in a smaller increase in Body Mass Index (BMI) compared to no intervention. In parallel with the desirable effects on weight, the cost-effectiveness of addressing obesity through PE increased considerably after 2 years of participation. It was found that a similar intervention would be viable in different European contexts, but some barriers to implementation were identified. The most prevalent barriers are lack of sustainable funding, low perceived importance of PE in the educational system, and inadequate infrastructure for physical activity in schools. (3)
- **Impact of COVID on PA:** Analysis showed that physical fitness declined in two-thirds of Slovenian children after the first wave of the pandemic and continued to decline further after the second wave. At the same time, body fat content increased in almost two-thirds of youth. (4)

*STOP publications are referenced (1-4)*

## Implications of findings for policy design

- **Active travel:** Interventions that promote active travel to school should be a policy priority. Firstly parents, then other groups such as traffic engineers and city designers, sociologists, and the school personnel should be involved in policy creation. Interventions should be in accordance with local cultures and behaviours; supported by promotion and education actions and sustained over time.
- **School-based PA Interventions** are an effective strategy in the primary prevention of childhood obesity among 6- to 12-year-old children. They should focus on PA (for girls most effective) and physical fitness (for boys most effective), last for more than 2 years but not shorter than 1 year, and each session should exceed 30 minutes. Interventions should not segregate children based on their socio-economic status.
- **Physical education interventions** should not be developed with obesity as their flagship purpose, they must be adapted for education systems specific to different countries and ideally require the cooperation of different stakeholders to develop. Decision makers need to find ways to overcome barriers such as funding. Sustainably designed operational infrastructure is key for the success of interventions.
- **COVID and PA:** The post - COVID period urgently requires population-based strategies that provide and encourage PA. Lessons need to be learnt to effectively plan for future responses to pandemic situations.



**Regular physical activity must be facilitated for children's physical and mental health now and for adulthood.**



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## Active travel <sup>(1)</sup>

**A review of 34 scientific papers addressing active travel in children was conducted.** A lack of evidence was found on successful policy interventions for non-school related active travel. However, interventions focused on increasing active travel for school journeys were found to be successful in primary age children. There was little evidence for adolescents.

Environmental factors found to promote AT include safety, social interactions, and the presence of facilities to assist walking and cycling. Distance from school was a hindrance to the relevance of AT interventions for home-school journeys, a radius of no more than 1.5 km by foot (15-16 minutes) / 3 km by bicycle was the limit.



## School-based PA interventions <sup>(2)</sup>

**Schools enable universal reach and represent an ideal setting for obesity strategies.** A systematic search of the literature was conducted to examine effects of the interventions set in schools that target sedentary behaviours, PA, or physical fitness.

Based on 146 studies there was a reduction in BMI ( $-0.16 \text{ kg m}^{-2}$  (95% CI =  $-0.25$  to  $-0.07$ ), for children in the PA intervention group. This small effect has limited clinical significance, but it should be considered that interventions are probably underestimated because of the well-known limitations of BMI in distinguishing fat from fat-free mass on one side and the large measurement error of commonly used methods for assessing body composition on the other side. It should also be acknowledged that school-based PA interventions produce small shifts at the population level that can incur significant public health benefits by reducing weight gain in healthy weight children.

**In addition, interventions that are longer in duration (at least over a year) encourage a high intensity of PA, and influence physical fitness maximise benefits.** However, raising awareness about the downsides of sedentary behaviour in addition to promoting PA does not provide additional benefits for obesity prevention. Preliminary evidence points to some inequalities, i.e., lower effectiveness of school based physical activity programs in the prevention of obesity among socially deprived children. Parents of this group of children are very hard to reach and therefore schools should be a focus of public health policies aimed at reducing health inequalities.

## Physical Education Interventions <sup>(3)</sup>

**A greater impact on population health can be achieved if interventions are up scaled to population wide level.** Based on the Slovenian Healthy Lifestyle Intervention, it was found that additional Physical Education (PE) in school can provide cost savings. For instance, additional PE contributes to a smaller increase in Body Mass Index (BMI) compared to no intervention, at a cost between €123.97 and €773.82 per BMI unit reduced. In parallel with the growing effects on weight, the cost-effectiveness of addressing obesity through PE increased considerably after 2 years of participation, reaching optimal levels after 4 years in girls and 5 years in boys and amounting to about €680.33 for one case of obesity averted.

Taking into consideration the long-term economic impact of obesity, simulations showed that 5-years of additional PE would provide return on costs after less than 2 months and that all programmes lasting over 2 years would become cost-saving in less than a year. The most prevalent barriers to implementing additional PE are lack of sustainable funding, low perceived importance of PE in the educational system, and inadequate infrastructure for physical activity in schools. Other potentially important barriers include high school workload and the lack of human resources.

**This research confirms that strategies to improve the quality and provision of PE should be prioritised as a cost-effective solution to improving the health and wellbeing of children across Europe.**



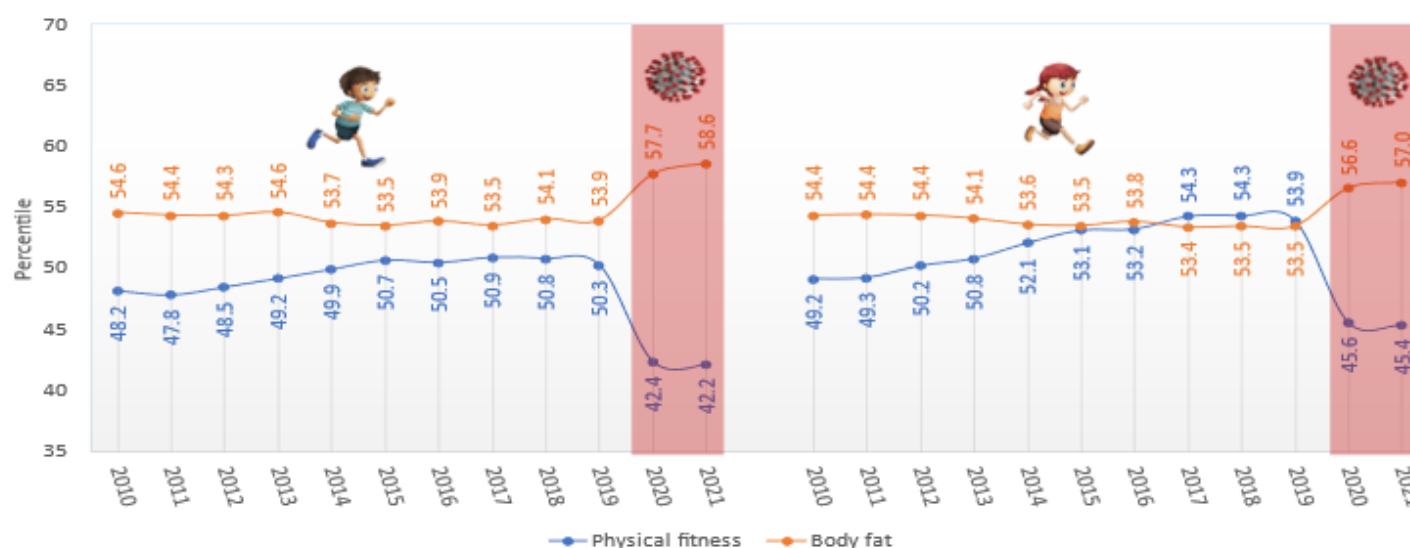
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## Children's PA and COVID-19<sup>(4)</sup>

**COVID-19 mitigation measures significantly reduced children's opportunities to engage in daily physical activity, hindering their physical development potential.**

Analysis showed that physical fitness declined in two-thirds of Slovenian children after the first wave of the pandemic and continued to decline further after the second wave. At the same time, body fat content increased in almost two-thirds of youth. Figure 1 demonstrates the relationship between physical fitness decrease and body fat increase for Slovenian boys and girls.

Changes in height, weight, triceps skinfold and BMI inevitably led also to an increasing prevalence of overweight, obesity and severe obesity in children. There was a dramatic increase in obesity between 2019 and 2020.



**Figure 1: Physical fitness decline and body fat increase for Slovenian boys and girls during the period of COVID-19 mitigation measures**

## Future research priorities

**The findings from the STOP project have provided new evidence and insights on the benefits and impacts of PA for preventing childhood obesity.**

Further research opportunities identified include:

- Differences in factors affecting active travel in different cultures, subcultures, and ethnicities in national level
- The quantity and type of PA (delivered in school settings) to provide optimal results with as little time and resource
- The inequity of interventions for socially disadvantaged children.



## STOP Publications (see [www.stopchildobesity.eu](http://www.stopchildobesity.eu) for an up-to-date list)

**The following publications are referenced within this factsheet:**

1. Sorić M, Podnar H, Karuc J et al. D7..1: Systematic review and evidence synthesis report; 2018 (<https://www.stopchildobesity.eu/wp-content/uploads/2021/10/D7.3.pdf>).
2. Podnar H, Jurić P, Karuc J et al. Comparative effectiveness of school-based interventions targeting physical activity, physical fitness or sedentary behaviour on obesity prevention in 6- to 12-year-old children: A systematic review and meta-analysis. *Obesity Reviews* 2021;22
3. Jurić P et al. Effectiveness of a population-scaled, school-based, physical activity intervention for the prevention of childhood obesity: a natural experiment. *Obesity* (in Review)
4. Grašič et al. Decline in physical fitness and increase of obesity in children following COVID-19 mitigation measures. *Scientific Reports* (in Review)