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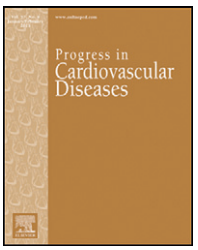

Supporting Public Health Priorities: Recommendations for Physical Education and Physical Activity Promotion in Schools

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ABSTRACT

Physical activity (PA) provides numerous physiological and psychosocial benefits. However, lifestyle changes, including reduced PA opportunities in multiple settings, have resulted in an escalation of overweight and obesity and related health problems. Poor physical and mental health, including metabolic and cardiovascular problems is seen in progressively younger ages, and the systematic decline in school PA has contributed to this trend. Of note, the crowded school curriculum with an intense focus on academic achievement, lack of school leadership support, funding and resources, plus poor quality teaching are barriers to PA promotion in schools. The school setting and physical educators in particular, must embrace their role in public health by adopting a comprehensive school PA program. We provide an overview of key issues and challenges in the area plus best bets and recommendations for physical education and PA promotion in the school system moving forward.

Physical activity and healthy growth and development

Health benefits of physical activity (PA) are well documented and include improved body composition and the prevention of overweight and obesity; and improved skeletal,[1] metabolic,[2] and cardiovascular health.[3,4] Benefits not only are limited to the biological, but also include numerous psychosocial advantages such as a reduction in the symptoms of depression, stress, anxiety, and improvements in self-confidence and self-esteem.[5,6] The collective benefits of participation in regular PA are important at all ages but critical in the formative years for healthy growth and development,[7,8] optimizing cardiometabolic function,[8] and preventing chronic disease.[9]

In recent decades, significant changes in lifestyle practices and reduced opportunities for PA mean that too many children and adolescents are not sufficiently active to realize health benefits. Declines in PA and corresponding increases in sedentary behaviors have resulted in an escalation of overweight and obesity and related health problems.[10–12] Outcomes are poor physical and mental health at progressively younger

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Abbreviations and Acronyms

CSPAP = comprehensive school physical activity program

CVD = cardiovascular disease

CRF = cardiorespiratory fitness

HOPE = health-optimizing physical education

VO_{2max} = maximal oxygen consumption

MVPA = moderate-to-vigorous physical activity

NASPE = National Association for Sport and Physical Education (NASPE)

PA = physical activity

PE = physical education

SCORES = Supporting Children's Outcomes using Rewards, Exercise and Skills

US = United States

ages such that children and adolescents present with metabolic and cardiovascular problems previously limited to adults (i.e., type 2 diabetes mellitus, atherosclerosis, etc.).

Health and motor-related components of fitness are markers of health status and influenced by physical growth and maturation during childhood and adolescence. Accordingly, it is challenging to separate the impact of regular participation in PA from growth and development *per se*. Growth and maturation continues despite limited physical activity, whereas sound nutritional practices (ideally in combination with PA), are essential to optimize growth and development. Therefore, when nutrition and PA is optimal, growth and development of an individual is more likely to match their genetic potential. Sadly, the opportunities for many youngsters to be PA are seriously limited[13] and this has resulted in significant declines in cardio-respiratory fitness (CRF).[14]

Current rates of physical activity

Many children and adolescents engage in low levels of PA and in many developed countries only a small proportion meet daily PA recommendations.[11,15,16] A concomitant trend is for sedentary behaviors to increase[17] such that physical inactivity is responsible for 6% of deaths globally (the fourth leading risk factor for mortality) and has been described as one of the greatest public health challenges of our time.[18]

Certainly PA guidelines have been developed based on empirical evidence and detail the minimum targets to maintain health at different ages.[17] These PA guidelines were originally developed for adults but have become progressively detailed for children of different ages. Such guidelines incorporate reference to intensity, duration and frequency of PA; however a primary question remains—how much PA is needed to provide a health benefit such as protection against metabolic and cardiovascular diseases (CVDs)? Clearly, PA guidelines must be used as indicators or desirable goals *above* habitual levels of PA. This is consistent with evidence from reviews of the literature that suggest that for positive health benefits from school-based interventions, exposure needs to be substantial, 60-min per day or higher.[4]

Start early to establish sound activity practices

Consistent with the notion of a link between early-life experiences and later health outcomes, greater attention is being given to the importance of exposure to PA opportunities during infancy and childhood. If health behaviors established during early life are more likely to persist or 'track' from childhood to adulthood, greater efforts should be made to capitalize on key opportunities, including in the school setting. Activity opportunities should not be considered solely in relation to physical education (PE) but also before and after school, during school breaks and where possible, an active curriculum.

Common sense suggests that individuals will be motivated to participate in and benefit more from engaging in PA they enjoy. Unfortunately, evidence suggests that we have engineered PA out of the daily lives of children and also often impose adult restrictions on activity time and movement opportunities.

Early, enjoyable activity experiences and 'tracking' of behaviors

Investment in PE has traditionally been predicated on the notion that physical skills developed during the elementary school years and consolidated during high school, would provide the foundation for engagement in PA in adulthood. In parallel with development of motor skills, is the expectation that PE is beneficial for the health of the developing child and that persistence or 'tracking' of PA into and across the adult years will provide ongoing health benefits.[19] However, very few longitudinal studies have addressed the long-term effect of PE as a child on physical activity as an adult and long-term general health and CVD benefits.[20]

Actual and perceived physical competences are important determinants of PA in young people, both of which contribute to an individual's success in physical endeavors and subsequent enjoyment.[21,22] Indeed, a recent systematic review and meta-analysis found a medium effect size for the relationship between affective judgment of PA (i.e., overall pleasure/displeasure, enjoyment, and feeling states) and actual behavior in young people, which is larger than other meta-analytic correlates in youth.[23] Logic suggests that enjoyment of PA as a youngster will increase the likelihood of the tracking of the PA habit across the lifespan.

Limitations of study design, including the widespread use of self-report *vs.* objective measures of PA, along with modest timeframes, have influenced our ability to be definitive regarding the tracking of PA[24] and the related impact of PE. From both a participation and health perspective, the nature of the activity experience, including stability over time requires further study to explore the tracking of different levels of PA. However, the rationale for commencing the PA experience from a young age, or intervening early in the case of inactive and overweight or obese children, is based on some degree of tracking of PA behavior or health parameter(s).[24] Telama et al.[19] have undertaken one of the most comprehensive analyses of tracking of multiple cohorts