

## Evidence Brief: The Positive Impacts of Physical Activity on the Whole Child



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### Issue and Research Question

Physical activity (PA) plays a vital role in the health and well-being of people of all ages, and is associated with positive outcomes relating to body adiposity/weight status, cardiometabolic markers, chronic disease prevention, and mental health.<sup>1-4</sup> For children and youth, regular participation in PA is important for establishing positive behaviours that can be maintained throughout the life course.

The Canadian Society for Exercise Physiology recommends that children and youth aged 5-17 should accumulate at least 60 minutes of moderate to vigorous-intensity PA (MVPA) daily to achieve health benefits.<sup>5</sup> This should include vigorous-intensity activity at least three days

per week, and activities that strengthen muscle and bone at least three days per week.

Unfortunately, it is estimated that only seven per cent of Canadian children and youth (ages 6-19) accumulate at least 60 minutes of MVPA at least six days a week.<sup>6</sup> In addition, over 30% of Canadian children and youth (ages 5-17) are reported to be overweight or obese (according to World Health Organization (WHO) Body Mass Index cut-offs).<sup>7</sup>

While the positive impacts of PA on physical health have been thoroughly researched, we reviewed the recent review-level literature on the positive impacts of PA on physical, mental/cognitive and social well-being of children and youth. This Evidence Brief asks: What are the positive impacts of PA on the

health of the whole child, i.e., including the physical, mental and social health well-being of the child? For the purpose of this review, we considered aspects of health according to the WHO's definition:

**Health:** A state of complete **physical, mental** and **social** well-being and not merely the absence of disease or infirmity.<sup>8</sup>

This definition is well-aligned with the concept of whole child often used in education settings, referring to aspects of cognitive, social, emotional, physical and ethical development within the child.<sup>9</sup>

## Methods

Ovid MEDLINE was searched by a Research Librarian on March 4, 2014. Inclusion criteria selected only: English-language review articles (systematic reviews and meta-analyses) published between 2010 and 2014. The search focused on the relationship between PA and health outcomes in children and youth (ages 2 - 18), relating to physical, mental/cognitive, or social well-being. Articles were first screened at the title and abstract level and then full versions of potentially relevant papers were retrieved.

Article titles and abstracts captured by initial searches were screened by two PHO staff reviewers working independently, and assessed for eligibility according to inclusion and exclusion criteria. Discrepancies in inclusion decisions were resolved by discussion. Articles that focused on a specific sub-population (outside of children and youth ages 2-18), medical condition, or mode of PA (e.g., swimming) were excluded, as were articles where PA was not the primary target for intervention or where the benefits of PA on other outcomes were not described.

Articles that appeared potentially relevant and met inclusion criteria were selected for full text

review. Additional articles were included following consultation with a content expert.

Relevant information was extracted from each article by two PHO staff reviewers working independently, with differences resolved by discussion. Findings were summarized by health outcome (i.e., physical, mental/cognitive and social well-being), recognizing the overlaps and interactions among these health concepts.

## Main Findings

The search identified 295 review articles, from which 19 unique articles met the inclusion criteria. Five additional articles were added from reference lists and content expert consult.<sup>10-14</sup> This resulted in a yield of 24 articles relevant to the research question.

Studies within the included reviews varied in terms of the study design (e.g., randomized control trial, cross-sectional, longitudinal) and type of PA (e.g., aerobic, resistance/strength training, flexibility, combination, etc.) although most focused on aerobic PA. As such, some of the findings and interpretations presented vary in relation to these factors. Specifically, while experimental and quasi-experimental studies can provide support for hypotheses that PA has a particular impact on health, cross-sectional/correlational studies can only highlight associations between PA and various health outcomes. These studies can inform hypotheses on the potential positive impacts of PA; however the direction of the relationships between variables cannot be described with certainty.

### Physical Health

The positive impact of PA on various physical health outcomes in children and youth is well-documented in the review-level literature, particularly in relation to aerobic physical activity. Experimental and intervention studies are highly represented in this literature, in addition to cross-sectional studies. Recent systematic reviews exploring this relationship in

children and youth have reported on improvements in various cardiometabolic markers such as blood pressure, blood lipids and cholesterol, insulin (resistance) and waist circumference.<sup>2,10,11,15-19</sup> Further, some of these associations may persist independently of time spent being sedentary or adiposity levels.<sup>16,18</sup> PA is also associated with improvements in body composition (e.g., adiposity),<sup>2,10,11,15,20-22</sup> and other measures of physical fitness (e.g., cardiorespiratory and muscular endurance/strength).<sup>2,11</sup> Physical activity, particularly weight-bearing and strength training exercises, is positively associated with skeletal health (e.g., bone mineral density),<sup>2,10,15,23</sup> which is especially beneficial later in life for delaying osteoporosis.<sup>23</sup> There is also evidence that engaging in PA in the early years leads to health benefits later in life with respect to adiposity measures.<sup>15</sup>

### **Mental Health and Cognition**

There is a growing body of evidence to support the positive association between PA and mental health and cognition among younger populations. Cross-sectional studies are major contributors to these findings, which limits causal inferences.

Several recent reviews have reported significant positive relationships between PA and various mental health outcomes, including improvements in self-esteem, and reductions in depressive symptoms, anxiety, and emotional distress.<sup>2,10,12,24-26</sup> Interestingly, Ahn and Fedawa<sup>24</sup> found that both children who are typical weight and obese/overweight demonstrate equal mental health benefits from PA. Ahn and Fedawa also reported that the greatest benefits were from resistance training or a combination of different types of PA programs.<sup>24</sup> It is important to note that the evidence base for the association between PA and mental health has been recognized as limited,<sup>25</sup> and effect sizes are considered to be small to modest.<sup>2,12,24</sup>

A positive relationship between PA and cognitive performance or academic achievement has been reported in several

recent reviews.<sup>10,12,15,25,27-31</sup> Specifically, PA, especially aerobic exercise in small to medium sized groups, may have positive impacts on achievement in mathematics and reading.<sup>27,29</sup> Furthermore, Efrat<sup>28</sup> found that the relationship between PA and academic outcomes existed regardless of socioeconomic status or ethnicity. Also, PA was just as beneficial—if not more so—for children with a cognitive or physical disability compared to children without such disabilities.<sup>29</sup>

### **Social Well-being**

The literature examining the direct relationship between PA and social well-being of youth is extremely limited. However, the relationship between certain opportunities for PA and social well-being has been explored more often. For instance, play time, recess and sport participation are all important opportunities for PA for children and youth, although the amount of PA may vary from minimal to excessive. These opportunities have been recognized as highly important for child social development. Cross-sectional studies contribute largely to these findings and may limit interpretation.

Play and recess have similar social benefits as reported in the literature. For example, beginning with the literature on pre-school children, Timmons, Naylor and Pfeiffer<sup>13</sup> reported that enhanced social cognitions (e.g., negotiation, hierarchy and emotional awareness) may be developed through play in preschool children aged 2-5. Similarly, Burniss and Tsao<sup>14</sup> reported social benefits of play for children aged 4-8, where involvement in pretend play was linked to peer acceptance and social skills. When children play with others, they learn to develop positive social behaviours such as cooperation, sharing, and engaging in social conversation with appropriate comments, as these behaviours are demonstrated by the most well liked/"popular" children.<sup>14</sup> Similarly to play, social and emotional benefits of recess include promotion of social-emotional learning and growth, when children have time to practice and role-play essential social skills.<sup>32</sup> Children learn valuable communication skills

such as negotiation, cooperation, sharing and problem solving during recess.<sup>32</sup>

Finally, relating to sport participation, a systematic review investigated the psychological and social benefits of participating in sports for children and youth, and found PA to result in improved social interaction/integration and social skills.<sup>26</sup> Other social benefits found to be both significantly and positively associated with sport participation include cooperation, showing respect and teamwork. It has been suggested that participation in sport, particularly team sports, may be associated with improved psychosocial health above and beyond improvements associated with general PA participation.<sup>26</sup>

## Discussion and Conclusions

Based on the review-level literature available at the time of this brief, PA has numerous positive impacts on the whole child, including potential benefits to children's physical, mental, and social well-being. However, the included systematic reviews and meta-analyses varied in terms of the strength of evidence, which limits the interpretation of associations between PA and health outcomes. There is a need for more high quality research to investigate the impacts of PA on mental and social well-being especially.

Furthermore, while the focus in much of the review literature is on aerobic PA, there is a need for research exploring the role of other types of exercise (e.g., strength training, flexibility, mind-body practices such as yoga, etc.) in contributing certain health outcomes. There is a need to explore the minimal doses (i.e., frequency, intensity and duration) of different types of exercise required to achieve greatest health benefits in children and youth throughout their development.<sup>2,11,21,31</sup>

## Implications for Practice

Less than 10% of Canadian children and youth are achieving daily PA recommendations.<sup>6</sup>

Based on the documented range of positive impacts of PA on the physical, mental and social well-being of children and youth, this finding should raise concern that most children and youth are missing the benefits of physical activity on physical, mental and social development, improved health and well-being.

Efforts are needed to facilitate and encourage involvement of children and youth in various types of physical activity starting at a young age. Governmental and non-governmental organizations can play a role in enforcing PA standards in child care facilities and schools, to improving access to recreation (i.e., to address barriers such as financial, transportation and parental awareness of opportunities and resources), and creating a more supportive environment for physical activity for those of all ages. A health equity lens should be applied in program planning so that the access of vulnerable populations (e.g., those who are low-income, children and youth with physical or cognitive disability, certain ethnic groups or new Canadians, etc.) is considered.

## Specifications and Limitations of this Evidence Brief

This Evidence Brief presents key findings from the scientific review-level literature. Its purpose is to investigate a research question in a timely manner to help inform decision making. This report is not a comprehensive review of the literature, but rather a rapid assessment of impacts demonstrated in review-level research evidence. There may be relevant studies that have not been included or which may be published after the date of this evidence brief. Although this brief is representative of findings from a broad body of literature, over time, primary study evidence may accumulate to a sufficient degree to alter the conclusions drawn from this report.

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