ENCYCLOPEDIA
on Early Childhood
Development

Physical Activity in Early Childhood: Topic Commentary

John J. Reilly, PhD

University of Strathclyde, Scotland, United Kingdom

November 2022, Éd. rév.

Introduction

The six contributions which make up the topic of physical activity in early childhood provide an accessible and critical summary and synthesis of the recent research evidence in this area from subject specialists.[1-6] Their first contributions to this topic collection, just over a decade ago, reflected increasing awareness that physical activity influenced health and development in early childhood. They also reflected increasing concern over research studies from the early 2000's which found that levels of physical activity in young children were lower than had been expected.

A new paradigm emerged in the past five years of '24-hour movement behaviours' (time spent in physical activity; sedentary behaviours, notably screen time; sleep) in early childhood.[7] The 24-hour movement behaviour paradigm sees physical activity, sedentary behaviour, and sleep as interrelated: if time spent on one of the behaviours increases then time spent on the other behaviours inevitably decreases. For example, daily time spent in sedentary behaviour increases each year from around the time children go to school,[8] and this displaces time spent in physical activity.[9]

©2022-2026 ABILIO | PHYSICAL ACTIVITY

There is a common misconception that what matters about screen time is the *content* and not the total time spent in front of screens- leading to suggestions that parents, health professionals, and policymakers should be concerned only about screen *content* (e.g., violence). Reviews and syntheses of research evidence in the past decade, summarized in the topic collection,[1-3,6] show that the total amount of time spent in front of screens does matter to health and development in early childhood, both directly by increasing exposure to harmful content (e.g., food advertising), and indirectly by displacing time spent in physical activity and sleep, and by displacing more beneficial forms of sedentary behaviour (such as reading/interactions with family members). The *timing* of screen time also matters - for example screen time in the hour or so prior to bedtime is harmful to sleep in early childhood.[10]

Major landmarks in the field in the past decade which followed the paradigm shift include the first global guidelines for time spent in the 24-hour movement behaviours for the Under 5s in 2019,[11] and global strategies for preventing and controlling childhood obesity by limiting screen time/promoting healthy sleep routines/promoting physical activity in early childhood.[12]

Research and Conclusions

The first three papers in the collection[1-3] summarize the evidence which led to common national (so far in Canada, New Zealand, Australia, and South Africa) and global (WHO) guidelines on physical activity, sedentary behaviour, and sleep in early childhood. They also summarize the guidelines on time spent in each of the behaviours. While the authors note that there are gaps and limitations in the evidence, these guidelines have been developed using robust and well-established methods. Users of the guidelines -parents, health and education professionals, and policymakers- should therefore have confidence in them.

While the guidelines for time spent in the 24-hour movement behaviours are still relatively new, use of the guidelines has been patchy so far. One of the main uses of guidelines like these is in public health surveillance (monitoring of what percentage of the early childhood population actually meet the guidelines). Surveillance is a core public health activity-but physical activity surveillance is limited in most countries at present.[13] Surveillance is how national governments answer important public health questions: Is not meeting guidelines common? Are there inequalities in meeting the guidelines? What are the trends over time? What are the positive or negative effects of policy and the impacts of major societal disruptions such as the COVID-19 pandemic?

Reviews of the global evidence suggest that screen time increased substantially, and time spent in physical activity decreased substantially in young children since the onset of the COVID-19 pandemic.[14,15] The extent to which these behaviours will recover to the pre-pandemic normal (which in itself was undesirable for most young children) is unclear.

De Craemer and colleagues[6] show that, despite a number of gaps and limitations in the evidence, only a minority of infants, toddlers, and young children globally meet the combined physical activity/sedentary behaviour/sleep guidelines. This seems to be the case even where that might be unexpected (e.g., in low-and middle-income countries, and in rural settings).[6] Time spent in front of screens typically exceeds WHO guidelines greatly, globally, and probably from infancy and toddlerhood into early childhood.[6]

Trost shows that simple and specific 'off the shelf' solutions to unhealthy levels of time spent in the movement behaviours are currently lacking.[5] However, the contributions by Trost[5] and by Hinkley and Salmon[3] provide hope that interventions to promote healthy levels of the 24-hour movement behaviours will be effective. Some 'best bet interventions' have been identified by research so far.[3,5] These include increasing time spent outdoors, parents facilitating active play and playing with their children, childcare /education centres offering both structured activity sessions and physically active unstructured play in outdoor spaces which are not too crowded, providing portable play equipment (which generally encourages higher activity levels than fixed play equipment) , greater use of stimulating outdoor environments with natural features, encouragement of active commuting to/from childcare centers.

Improving time spent in the 24-hour movement behaviours across the whole population of young children is also likely to need changes *beyond* the home environment and the childcare/education/healthcare environments. Cultural changes (to habits/norms), and more 'upstream' policy changes are likely to be required[13] for example, to restrict screen time, to change transportation and the built environment in ways which encourage physical activity and penalize physical inactivity. A rights-based approach might also be helpful. Active play is so important to child health and development that it has been enshrined in the UN Rights of the Child, and so greater emphasis on the right to play may drive policy changes which improve levels of the 24-hour movement behaviours in early childhood.[13]

Greater policymaker awareness of the 'co-benefits' of meeting the 24-hour movement guidelines in early childhood might also encourage policy change/more effective policy implementation:

many high-income countries have favourable childhood physical activity policies but these are generally not well implemented or evaluated.[12] A higher prevalence of meeting the 24-hour movement behaviour guidelines in early childhood would have significant benefits beyond physical and mental health-for cognitive development and educational outcomes, public health COVID recovery, the climate crisis (e.g., by greater nature connectedness, by reduced dependence on motorized transport), the UN Sustainable Development Goals.[13]

Conclusion

In summary, the topic collection provides a critical summary of current scientific evidence on physical activity, sedentary behaviour and sleep in early childhood. Time spent in these behaviours in contemporary young children is usually inconsistent with optimal health and development. The topic collection provides a number of useful pointers to improving time spent in these behaviours in early childhood, and should be a valuable source of evidence-based guidance for families, health and education professionals and policymakers.

References

1. Cliff DP, Janssen X. Levels of Habitual Physical Activity in Early Childhood. In: Tremblay RE, Boivin M, Peters RDeV, eds. Reilly JJ, topic ed. *Encyclopedia on Early Childhood Development* [online]. https://www.child-encyclopedia.com/physical-activity/according-experts/levels-habitual-physical-activity-early-childhood. Updated: September 2019. Accessed November 16, 2022.

2. Jones RA, Okely AD. Physical Activity Recommendations for Early Childhood. In: Tremblay RE, Boivin M, Peters RDeV, eds. ReillyJJ, topic ed. *Encyclopedia on Early Childhood Development* [online]. https://www.child-encyclopedia.com/physical-activity/according-experts/physical-activity-recommendations-early-childhood. Updated: February 2020. Accessed November 16, 2022.

3. Hinkley T, Salmon J. Correlates of Physical Activity in Early Childhood. In: Tremblay RE, Boivin M, Peters RDeV, eds. Reilly JJ, topic ed. *Encyclopedia on Early Childhood Development* [online]. https://www.child-encyclopedia.com/physical-activity/according-experts/correlates-physical-activity-early-childhood. Published: January 2011. Accessed November 16, 2022.

4. Jones RA, Okely AD. Sedentary Behaviour Recommendations for Early Childhood. In: Tremblay RE, Boivin M, Peters RDeV, eds. Reilly JJ, topic ed. *Encyclopedia on Early Childhood Development* [online]. https://www.child-encyclopedia.com/physical-activity/according-experts/sedentary-behaviour-recommendations-early-childhood. Updated: February 2020. Accessed November 16, 2022.

5. Trost SG. Interventions to Promote Physical Activity in Young Children. In: Tremblay RE, Boivin M, Peters RDeV, eds. Reilly JJ, topic ed. *Encyclopedia on Early Childhood Development* [online]. https://www.child-encyclopedia.com/physical-activity/according-experts/interventions-promote-physical-activity-young-children. Updated: June 2020. Accessed November 16, 2022.

6. De Craemer M, Verbestel V, Decraene M, Naeyaert S, Cardon G. Physical Activity, Sedentary Behaviour and Sleep in Infants, Toddlers, and Preschoolers. In: Tremblay RE, Boivin M, Peters RDeV, eds. Reilly JJ, topic ed. *Encyclopedia on Early Childhood Development* [online]. https://www.child-encyclopedia.com/physical-activity/according-experts/physical-activity-infants-and-toddlers. Updated: November 2022. Accessed November 16, 2022.

7. Okely AD, Tremblay MS, Reilly JJ, Draper CE, Bull F. Physical activity, sedentary behaviour, and sleep: movement behaviours in early life. *The Lancet. Child & Adolescent Health.* 2018;2(4):233-235. doi:10.1016/S2352-4642(18)30070-1

8. Tanaka C, Reilly JJ, Huang WY. Longitudinal changes in objectively measured sedentary behaviour and their relationship with adiposity in children and adolescents: systematic review and evidence appraisal. *Obesity Reviews*. 2014;15(10):791-803. doi:10.1111/obr.12195

9. Farooq A, Martin A, Janssen X, et al. Longitudinal changes in moderate-to-vigorous-intensity physical activity in children and adolescents: A systematic review and meta-analysis. *Obesity Reviews*. 2020;21(1):e12953. doi:10.1111/obr.12953

10. Janssen X, Martin A, Hughes AR, Hill CM, Kotronoulas G, Hesketh KR. Associations of screen time, sedentary time and physical activity with sleep in under 5s: A systematic

review and meta-analysis. *Sleep Medicine Reviews*. 2020;49:101226. doi:10.1016/j.smrv.2019.101226

11. World Health Organization. Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age. World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO. Accessed November 16, 2022. https://apps.who.int/iris/handle/10665/311664

12. World Health Organization. Report on the Commission on Ending Childhood Obesity. World Health Organization; 2016.

13. Reilly JJ, Aubert S, Brazo-Sayavera J, Liu Y, Cagas JY, Tremblay MS. Surveillance to improve child and adolescent physical activity. *Bulletin of the World Health Organization.* In press.

14. Neville RD, Lakes KD, Hopkins WG, et al. Global Changes in Child and Adolescent Physical Activity During the COVID-19 Pandemic: A Systematic Review and Meta-analysis. *JAMA Pediatrics.* 2022;176(9):886-894. doi:10.1001/jamapediatrics.2022.2313

15. Madigan S, Eirich R, Pador P, McArthur BA, Neville RD. Assessment of Changes in Child and Adolescent Screen Time During the COVID-19 Pandemic: A Systematic Review and Meta-analysis [published online ahead of print, 2022 Nov 7]. *JAMA Pediatrics.* 2022;10.1001/jamapediatrics.2022.4116. doi:10.1001/jamapediatrics.2022.4116