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Integrating physical activity, sleep and sedentary behaviour — a world first!

The Canadian 24-Hour Movement Guidelines for Children and Youth

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It is becoming clear that behaviours along the movement continuum (i.e., physical activity, sedentary behaviour and sleep) interact, such that their combined effects on health extend beyond the individual contributions of each behaviour (Figure 1). For example, the benefits of moderate- to vigorous-intensity physical activity can be reduced if children have poor sleep habits or engage in excessive sedentary behaviours (like screen time).¹ Conversely, increased physical activity could attenuate the negative effects of insufficient sleep and/or extended periods of sitting in some individuals.¹ Therefore, it is the *combination* of movement behaviours that is important with respect to health.

However, until recently, guideline recommendations for these behaviours in Canada, and elsewhere in the world, existed in isolation — that is, each behaviour was thought of as separate and independent of the others. This segregated approach is akin to dismantling *Canada's Food Guide* into separate guidelines for each food group and implying there is no interrelationship between the groups. This approach is not only misguided but also has the potential to cause harm by implying that movement behaviours are unrelated (e.g., as long as you get your 60 minutes of physical activity, it does not matter how sedentary you are for the rest of the day or if you slept well the night before).

Therefore, to address this issue, and to provide guidance based on the best available evidence, a team of Canadian and international experts undertook a process to develop the *Canadian 24-Hour Movement Guidelines for Children and Youth: An Integration of Physical Activity, Sedentary Behaviour, and Sleep* — the first such guidelines developed anywhere in the world.

SUMMARY

The new *Canadian 24-Hour Movement Guidelines for Children and Youth: An Integration of Physical Activity, Sedentary Behaviour, and Sleep* was developed through a robust and transparent process, and it is the first developed anywhere in the world.

It emphasizes the importance of a healthy balance of movement behaviours and recommends that children “Sweat, Step, Sleep and Sit” in the right amounts to be healthy.

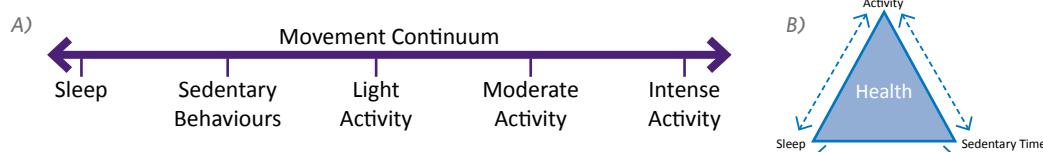


Figure 1. A) The Movement Continuum. Movement exists on a continuum, from no movement or very little movement (i.e., sleep and sedentary behaviours) to vigorous-intensity exercise. B) Movement-related behaviours make up the full 24-hour day and interact to collectively impact health. Adapted from Chaput et al. 2014.¹

How were the Guidelines Developed?

The development of evidence-based guidelines is an enormous undertaking. The steps for this process, and the timeline along which these steps occurred, are outlined in Figure 2. In brief, the process followed these general steps:

1. The Guideline Consensus Panel and subset committees (Leadership and Steering Committees) were formed. The Guideline Consensus Panel consisted of 27 members, including:
 - research and practice experts in physical activity, sedentary behaviour, sleep and health promotion;
 - methodological experts;
 - international content experts (Australia, USA, Wales);
 - members of the target population (parent and youth);
 - representatives from each of the funding partners: the Canadian Society for Exercise Physiology (CSEP), Healthy Active Living and Obesity Research Group (HALO) at the Children's Hospital of Eastern Ontario Research Institute, The Conference Board of Canada; Public Health Agency of Canada (PHAC), and ParticipACTION; and
 - additional invited representatives from the Canadian Pediatric Society, Canadian Sleep Society, and Sedentary Behaviour Research Network.
2. The Guideline Consensus Panel convened a Planning Meeting (International Consensus Meeting #1) to review the guideline development process and to establish the workplan, responsibilities and timelines.
3. Evidence to inform the guidelines was synthesized in the form of four systematic reviews (that provided a comprehensive and balanced summary of existing research) and novel analyses (using a large, nationally-representative sample of Canadian children).
 - The systematic reviews examined the relationships between movement behaviours (i.e., physical activity, sedentary behaviour, sleep, and combinations of these behaviours) and health indicators in children and youth (aged 5-17 years). The health indicators of interest were determined by expert consensus and were chosen to represent a range of holistic indicators of physical, psychosocial and cognitive health.
 - Novel analyses ("compositional" analyses) were done using a nationally-representative sample of Canadian children and youth (data from the Canadian Health Measures Survey) to examine the relationships between the combination or "cocktail" of movement behaviours and desirable indicators of health.
 - Manuscripts detailing all evidence that informed the guidelines can be found at <http://www.nrcresearchpress.com/toc/apnm/41/6+28Suppl.+3%29>.
4. A second International Consensus Meeting was convened to draft guidelines based on the information gathered in the systematic reviews and compositional analyses.



Figure 2. Timeline of events involved in the development of the Canadian 24-Hour Movement Guidelines for Children and Youth: An Integration of Physical Activity, Sedentary Behaviour, and Sleep.

AGREE – Appraisal of Guidelines for Research and Evaluation;
APNM – Applied Physiology, Nutrition, and Metabolism;
CSEP – Canadian Society for Exercise Physiology;
PICO – Population, Intervention, Comparator, Outcomes.

Figure from Tremblay et al., 2016.²

5. More than 700 stakeholders were surveyed through an online survey and in-person focus groups and interviews for comments and concerns regarding the initial draft guidelines (see doi:10.1139/apnm-2016-0100).
6. A Guideline Revision Meeting (i.e., Leadership Group Meeting) was held to revise the draft guidelines based on stakeholder feedback while staying true to the evidence base. The “final” version of the guidelines was formally copy-edited and approved by the Guideline Consensus Group (in English and French).
7. The resources and supports necessary to facilitate strategic and proactive dissemination, promotion and implementation of the new guidelines were considered, and strategies to optimize guideline uptake and activation were identified (see doi: 10.1139/apnm-2016-0086). Proactive work regarding Communications Planning (e.g., development of messaging strategies) and Knowledge Translation was done. This included the development of a visual identity for the guidelines, along with public-facing tools and resources (accessible through the CSEP and ParticipACTION websites).
8. In June of 2016, the guidelines were launched to Canadians, together with the ParticipACTION Report Card.

In total, the process took approximately two years from start to finish. More details can be found in a paper by Tremblay and colleagues,² and in the “Guideline Development Report” on the CSEP website.

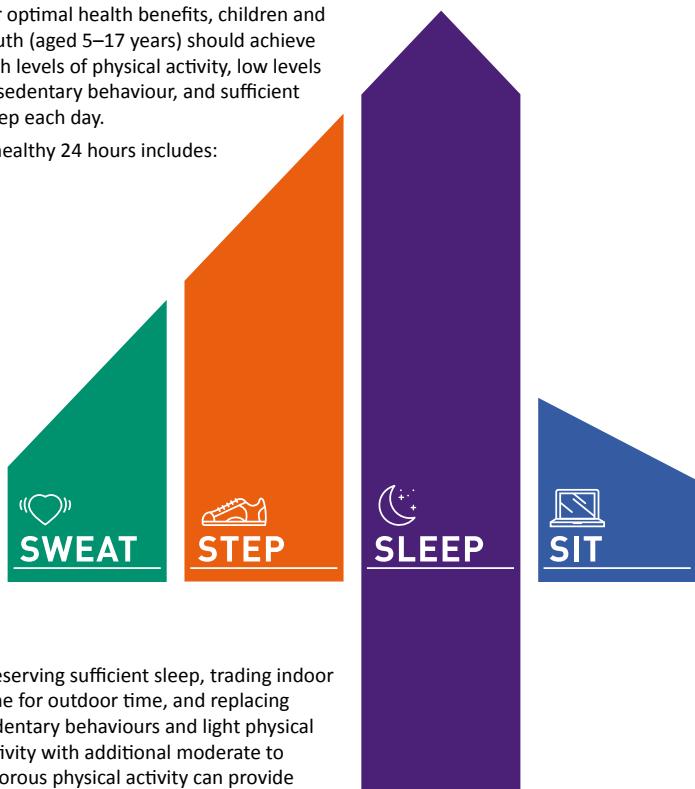
What are the Guidelines?

The new *Canadian 24-Hour Movement Guidelines for Children and Youth* replaces the existing isolated guidelines and encourage children to “Sweat, Step, Sleep and Sit” in a manner that promotes health. The specific guidelines are shown in Figure 3.

GUIDELINES

For optimal health benefits, children and youth (aged 5–17 years) should achieve high levels of physical activity, low levels of sedentary behaviour, and sufficient sleep each day.

A healthy 24 hours includes:



SWEAT

MODERATE TO VIGOROUS PHYSICAL ACTIVITY

An accumulation of at least 60 minutes per day of moderate to vigorous physical activity involving a variety of aerobic activities. Vigorous physical activities, and muscle and bone strengthening activities should each be incorporated at least 3 days per week;

STEP

LIGHT PHYSICAL ACTIVITY

Several hours of a variety of structured and unstructured light physical activities;

SLEEP

SLEEP

Uninterrupted 9 to 11 hours of sleep per night for those aged 5–13 years and 8 to 10 hours per night for those aged 14–17 years, with consistent bed and wake-up times;

SIT

SEDENTARY BEHAVIOUR

No more than 2 hours per day of recreational screen time; Limited sitting for extended periods.

The Canadian 24-Hour Movement Guidelines for Children and Youth support a balance of physical activity, sedentary behaviour, and sleep — all requirements for a healthy childhood.

Figure 3. The Canadian 24-Hour Movement Guidelines for Children and Youth: An Integration of Physical Activity, Sedentary Behaviour, and Sleep. Figure from Tremblay et al., 2016.² The guidelines are available on the CSEP website.

ABOUT THE AUTHORS



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Who do the Guidelines Apply to?

The guidelines are relevant to apparently healthy children and youth (aged 5-17 years), irrespective of gender, race, ethnicity, or the socio-economic status of the family. The guidelines may be appropriate for children and youth with a disability or medical condition; however, a health professional should be consulted for additional guidance.

Who can Use the Guidelines?

The guidelines can be used by children and youth, parents, teachers, healthcare providers, fitness professionals, researchers, and policy-makers. The long-term objectives of these guidelines are to:

- enhance the promotion of healthy active lifestyles and to improve overall health and well-being among children and youth across Canada;
- inform healthy active living policies at the local, provincial, and national levels; and
- provide international leadership and advance a global healthy active living agenda.

The guidelines are freely available in English and French on the [CSEP website](#).

What is the Take-home Message?

A healthy childhood requires a balance of physical activity, sedentary behaviour and sleep. The *Canadian 24-Hour Movement Guidelines for Children and Youth* was developed through a robust and transparent process, and it provides guidance for achieving this healthy balance. The evidence strongly supports this fundamental shift from focusing on movement behaviours in isolation to an integrated approach and the concept that "the whole day matters". Children and youth need high levels of physical activity, low levels of sedentary behaviour, and sufficient sleep each day — they need to "Sweat, Step, Sleep and Sit" in the right amounts to be healthy!

Want to Learn More?

Details of the background research, consultations, implications, and process to develop the guidelines are all published in nine papers in a special issue (CSEP Special Supplement, Vol. 41, No. 6, Suppl. 3) of the journal *Applied Physiology, Nutrition, and Metabolism* that is freely available. Full details and all materials related to the new guidelines are available on the [CSEP website](#).

Acknowledgments

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