Canadian Physical Activity Guidelines for the Early Years (aged 0–4 years)

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Abstract: The Canadian Society for Exercise Physiology (CSEP), with assistance from multiple partners, stakeholders, and researchers, developed the first Canadian Physical Activity Guidelines for the Early Years (aged 0–4 years). These national guidelines were created in response to an urgent call from public health, health care, child care, and fitness practitioners for healthy active living guidance for the early years. The guideline development process was informed by the Appraisal of Guidelines for Research Evaluation (AGREE) II instrument and the evidence assessed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system. The recommendations are informed by evidence from a systematic review that examined the relationships between physical activity and health indicators (healthy body weight, bone and skeletal health, motor skill development, psychosocial health, cognitive development, and cardio-metabolic disease risk factors) for three age groups (infants aged <1 year; toddlers aged 1–2 years; preschoolers aged 3–4 years). The new guidelines include a preamble to provide context, followed by the specific recommendations. The final guidelines benefitted from an extensive on-line consultation process with input from over 900 domestic and international stakeholders, end-users, and key informants. The final guideline recommendations state that for healthy growth and development, infants (aged <1 year) should be physically active several times daily – particularly through interactive floor-based play. Toddlers (aged 1–2 years) and preschoolers (aged 3–4 years) should accumulate at least 180 min of physical activity *at any intensity* spread throughout the day, including a variety of activities in different environments, activities that develop movement skills, and progression toward at least 60 min of energetic play by 5 years of age. More daily physical activity provides greater benefits.

Key words: physical activity, recommendations, guidelines, measurement, children, infants, early years, play, preschoolers.

Résumé : La Société canadienne de physiologie de l'exercice (SCPE) en collaboration avec plusieurs partenaires, parties prenantes et chercheurs a élaboré de nouvelles Directives canadiennes en matière d'activité physique pour la petite enfance (enfants âgés de 0 à 4 ans). Ces directives nationales répondent à une demande pressante des praticiens en santé publique, en soins de santé, en pédiatrie et en condition physique désireux de promouvoir une vie active saine dès les premières années de la vie. L'élaboration complète des directives a respecté la *Grille II d'évaluation de la qualité des recommandations*

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pour la pratique clinique (AGREE) et la qualité des données a été évaluée au moyen de la méthodologie GRADE (*Grading of Recommendations Assessment, Development and Evaluation*). Les recommandations présentées dans cet article sont basées sur les données probantes d'une analyse documentaire systématique portant sur les relations entre l'activité physique et des indicateurs de santé (masse corporelle saine, santé des os et du squelette, développement des habiletés motrices, santé psychosociale, développement cognitif et facteurs de risque de maladie cardiométabolique) chez trois groupes d'âge (nourrissons <1 an, tout-petits âgés de 1–2 ans, enfants d'âge préscolaire, 3–4 ans). Les nouvelles directives sont composées d'un préambule situant le contexte et de directives spécifiques. Les directives finales ont bénéficié des fruits d'une vaste consultation en ligne auprès de plus de 900 intervenants concernés, d'utilisateurs finaux et de sources de premier plan, sur la scène nationale et internationale. La directive finale énonce ce qui suit : pour favoriser une croissance et un développement sains, les nourrissons (âgés de <1 an) devraient être physiquement actifs plusieurs fois par jour, particulièrement par l'entremise de jeux interactifs au sol. Les tout-petits (âgés de 1–2 ans) et les enfants d'âge scolaire (âgés de 3–4 ans) devraient être physiquement actifs chaque jour, quelle que soit l'intensité, pendant au moins 180 min réparties sur toute la journée, cela devrait comprendre une variété d'activités dans divers environnements à différentes intensités, des activités qui permettent de développer les habiletés motrices et une progression vers au moins 60 min de jeu actif à l'âge de 5 ans. S'adonner chaque jour à encore plus d'activité physique entraîne plus de bienfaits.

Mots-clés : activité physique, recommandations, directives, mesures, enfants, nourrissons, petite enfance, jeu, enfants d'âge préscolaire.

Introduction and background

Research on Canadian school-aged children provides strong evidence that obesity prevalence is at unprecedented high levels (Shields 2006; Tremblay and Willms 2000; Tremblay et al. 2002), physical fitness is declining (Tremblay et al. 2010*b*), and physical activity levels are low (Colley et al. 2011). Obesity levels are high even in the early years (Canning et al. 2004; Shields 2006), which are defined in this paper as 0–4 years (i.e., birth to 4.99 years). Engaging in regular physical activity is widely accepted as an effective preventative measure for not only obesity, but a variety of health risks in school-aged children (Janssen 2007; Janssen and LeBlanc 2010; Physical Activity Guidelines Advisory Committee 2008; World Health Organization 2010) but the evidence to support the health benefits of physical activity for the early years is less clear (Timmons et al. 2007).

Between 1998 and 2002, Health Canada and the Canadian Society for Exercise Physiology (CSEP) released the first set of physical activity guidelines for school-aged children, youth, adults, and older adults to set measurable targets for surveillance, provide guidance to public health professionals, and motivate Canadians to be more active (Tremblay et al. 2007*a*). With leadership from the CSEP, the process to develop new (updated) physical activity guidelines began in 2006 and led to the release of new Canadian physical activity guidelines for school-aged children (aged 5–11 years), youth (aged 12–17 years), adults (aged 18–64 years), and older adults (aged 65 years and older) in January 2011 (Tremblay et al. 2011*a*). Details of the process leading to these new guidelines have been published elsewhere (Tremblay et al. 2007*a*, 2007*b*, 2010*a*, 2011*a*) and involved experts in the fields of exercise physiology, the psychosocial aspects of physical activity, social marketing, epidemiology, pediatrics, gerontology, public health, fitness, and physical activity guideline development. While creating these new (updated) guidelines, additional gap areas were identified, including the need for physical activity guidelines for children in the early years, among other segments of the population (e.g., individuals who are Aboriginal, disabled, pregnant) (CSEP 2009; Tremblay et al. 2011*a*).

The need for guidelines for the early years is evident from an earlier paper by Timmons et al. (2007); based on journal access records, this paper was downloaded 2–5 times more frequently (nearly 6000 downloads) than the other foundation papers used for the updated guidelines (Tremblay et al. 2007*b*). Furthermore, during the consultation processes for the guidelines for school-aged children, youth, adults, and older adults completed by the CSEP (CSEP 2011) and the Public Health Agency of Canada, we observed a strong demand for physical activity guidelines for the early years. Finally, the recent release of physical activity guidelines for the early years from Australia (Australian Government 2010) and the United Kingdom (Start Active Stay Active 2011) fuelled the effort to fill this gap in Canada and meet a clear demand for guidance from health and health care professionals and the child care sector. To date, Canadian researchers have had to use American guidelines when evaluating the physical activity levels of preschoolers (Obeid et al. 2011; Temple et al. 2009; Tucker 2008).

This paper briefly outlines the process and outcomes for the development of the first Canadian Physical Activity Guidelines for the Early Years (aged 0–4 years), which were released in March 2012 by the CSEP. The new guidelines were informed by a rigorous and transparent process, and recommendations are based on a systematic review of the scientific evidence, expert consensus, and input from stakeholders. A detailed report outlining the full guideline development process, with related materials, can be accessed through the CSEP Web site at http://www.csep.ca/english/view.asp?x=804. The purpose of this paper is to provide a summary of this process and to present the guidelines themselves.

Methods

The entire guideline development process followed the framework explained in detail by Tremblay and Haskell (2012). Briefly, 15 stages are included in the guideline development process: establishing a leadership team; instituting process assessment procedures; forming a guideline development and research committee; international and inter-jurisdictional

guideline harmonization; systematic literature review; interpretation of findings; identification of research gaps; consensus and stakeholder engagement; knowledge translation strategy (including language translation, messaging, communication strategy, dissemination strategy); evaluation; and update and revision planning.

Figure 1 provides a summary of the events leading to the development of the first Canadian Physical Activity Guidelines for the Early Years (aged 0–4 years). Details on the events and processes between 2006 and 2010 are provided elsewhere (Tremblay et al. 2007*a*, 2007*b*, 2010*a*, 2011*a*; CSEP 2009). After the release of the new physical activity guidelines for school-aged children, youth, adults, and older adults (Tremblay et al. 2011*a*), the CSEP targeted the early years as the next priority for guideline development. The CSEP, with assistance from ParticipACTION and the Healthy Active Living and Obesity Research Group (HALO) at the Children's Hospital of Eastern Ontario Research Institute, provided leadership to the project. A Canadian Institutes of Health Research Knowledge Synthesis grant provided financial assistance for the project.

The guideline development process was informed by the Appraisal of Guidelines for Research Evaluation (AGREE) II instrument (Brouwers et al. 2010*a*, 2010*b*, 2010*c*). AGREE II is the internationally accepted standard for guideline development that guides and assesses scientific rigour and transparency throughout the process. Two research methodology consultants (S.C.G., M.E.K.) were engaged to advise the leadership team on best practices for developing the guidelines and conducting the systematic review.

A Guideline Development and Research Committee composed of the authors of this paper was formed and provided the human resources and expertise to complete the guidelines development tasks. This committee provided input and guidance on the systematic literature review, interpretation of research findings, international and inter-jurisdictional guideline harmonization, and identification of research gaps.

The purpose of the systematic review was to compile and assess the available evidence examining the relationship between physical activity and health indicators in the early years to assist in the development of public health guidelines. Our research question was "what is the frequency, intensity, time and type of physical activity, as measured by direct and indirect methods, associated with improved health indicators in the early years?" The systematic review aimed to identify and synthesize the best available evidence for the minimal and optimal amount of physical activity needed to promote healthy growth and development (i.e., healthy body weight, bone and skeletal health, motor skill development, psychosocial health, cognitive development, and cardio-metabolic disease indicators) in infants (<1 year), toddlers (1–2 years), and preschoolers (3–4 years). Studies that had measures during the early years as well as follow-up measures later in life were also included. The evidence from the systematic review was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system (Balshem et al. 2011; Guyatt et al. 2008) and it was registered on the international prospective register of systematic reviews PROSPERO network (registration number: CRD42011001243). Relevant studies were identified through online databases (Ovid MEDLINE, Ovid EMBASE, Ovid psycINFO, EBSCO SPORTDiscus, and Cochrane Central Database), personal libraries, and government documents. Only high-quality studies (i.e., experimental studies, case-control studies, and prospective cohort studies) were included in the review. A priori by age group, we prioritized the most relevant healthy growth and development indicators (Table 1). More details on the systematic review can be found elsewhere (Timmons et al., in press).

Consensus meeting

In December 2011, the Guideline Development and Research Committee convened for a 1.5 day consensus meeting where the draft guidelines were written. The guideline recommendations were informed by evidence from the systematic review described above. Participants also received background materials, including documents that helped inform similar guidelines in the United Kingdom and Australia, previous Canadian physical activity guideline papers, and information explaining the GRADE and AGREE II processes. The resulting product of the consensus meeting was a preamble to explain the guidelines, followed by the guidelines themselves. The draft guidelines were then sent to stakeholders for comment and input.

Stakeholder involvement

Throughout the guideline development process, there was substantial stakeholder involvement, including scientists, guideline developers, and future guideline users. The scientific stakeholders were engaged in formulating the research questions, interpreting the evidence, drafting the guidelines, participating in the stakeholder consultation, writing this paper, and completing the systematic review. The Guideline Development and Research Committee also included representatives involved in physical activity guidelines development for the early years in Australia (A.D.O.) and the United Kingdom (J.J.R.), health professionals, and end users of the guidelines. Based on the evidence summarized in the systematic review and the draft guidelines prepared at the December 2011 consensus meeting, we also sought feedback from a wide range of stakeholders interested in physical activity and health promotion for the early years, including national and international content experts, health professionals, government and non-governmental organizations, teachers, caregivers, and parents. Stakeholders were encouraged to share the CSEP survey with their peers and colleagues to further expand the consultation base.

The consultation was completed through an on-line survey conducted in December 2011. The CSEP on-line survey consisted of 12 questions about the wording of, and agreement with, the proposed physical activity guidelines and their associated preamble. Written comments were invited and respondents were informed that they would receive updated and refined guidelines when the survey process was completed. In December 2011, the Guideline Development and Research Committee re-convened to address the concerns and comments identified from the stakeholder consultations and revised the guidelines and preamble accordingly. The final guidelines are presented in this paper.

Fig. 1. Summary of the timeline and key events in the development of the Canadian Physical Activity Guidelines for the Early Years (aged 0–4 years).

Results

Systematic review

Complete details of the systematic review are being published separately (Timmons et al., in press). The search identified 11 222 papers (7872 after de-duplication) and 18 unique studies, representing the 22 papers that met our inclusion criteria (some covering more than one health indicator or age group). Of the unique studies included, the number of papers reporting on each outcome of interest were adiposity (n = 11), bone and skeletal health (n = 2), motor development (n = 4), psychosocial health (n = 3), cognitive development (n = 1), and cardio-metabolic health indicators (n = 3). By age group, 5 unique studies involved infants, 2 unique

Table 1. A priori consensus rankings assigned by the Guideline Development and Research Committee for each health indicator by age group.

Health indicator	Infant (<1 year)	Toddler (1–2 years)	Preschooler (3–4 years)
Adiposity (e.g., overweight, obesity, BMI)	Critical	Critical	Critical
Bone (e.g., bone and skeletal health)	Unimportant	Important	Critical
Motor development (e.g., gross motor skills, locomotor/object control)	Critical	Critical	Critical
Psychosocial health (e.g., self-efficacy, self esteem, pro-social behaviour, temperament, aggression, social functioning)	Unimportant	Critical	Critical
Cognitive development (e.g., language development, attention)	Important	Important	Critical
Cardio-metabolic health (e.g., blood pressure, insulin resistance, blood lipids)	Unimportant	Unimportant	Important
Risks (injury)	N/A	N/A	N/A

Note: Health indicators were ranked based on whether they were critical for decision-making, important but not critical, or of low importance for decision-making. The focus when searching and summarizing the evidence was on indicators that were important or critical. Rankings were based on the GRADE framework (Guyatt et al. 2011).

studies involved toddlers, and 11 unique studies involved preschoolers. Quality of evidence was assessed according to the GRADE framework (Balshem et al. 2011). In infants, there was low to moderate quality evidence to suggest that increased or higher physical activity is positively associated with improved measures of adiposity, motor skill development, and cognitive development. In toddlers, there was moderate quality evidence to suggest that increased or higher physical activity was positively associated with bone and skeletal health. In preschoolers, there was low to high quality evidence on the relationship between increased or higher physical activity and improved measures of adiposity, motor skill development, psychosocial health, and cardio-metabolic health indicators. In summary, the systematic review found that higher levels of physical activity were associated with better measures of adiposity, cognitive and motor skill development, psychosocial health, and aspects of cardio-metabolic health during the early years. No study specifically examined the risks associated with increased physical activity in this age group and it was the judgement of the guideline panel that the benefits of increased physical activity exceeded the risks associated with higher levels of physical activity.

The research available through the systematic review did not provide specific information on the dose of physical activity necessary for optimal health in the early years. In the absence of such evidence, the results of the systematic review were supplemented by expert consensus, international harmonization, and stakeholder input to inform these guidelines.

Consultation feedback

Nine-hundred and twenty-five stakeholders responded through the on-line consultation process and 212 provided additional comments and suggestions. The results of this on-line consultation were reviewed by the Guideline Development and Research Committee. Overall, 95% of respondents "completely agreed" or "agreed" with the proposed preamble and guideline recommendations. Because we recruited respondents using a "snowball" process, we were unable to calculate a response rate for the on-line survey. A complete summary of the results can be found at http://www.csep.ca/english/view.asp?x=879. Following peer-review, we made minor editorial revisions to the preamble and guidelines that did not materially change the consensus recommendations. All guideline committee members agreed with the final version of the guidelines herein.

Final guidelines

The Canadian Physical Activity Guidelines for the Early Years (aged 0–4 years) are presented below.

Preamble

These guidelines are relevant to all apparently healthy infants (aged <1 year), toddlers (aged 1–2 years), and preschoolers (aged 3–4 years), irrespective of gender, race, ethnicity, or socio-economic status of the family. Parents and caregivers should encourage infants, toddlers, and preschoolers to participate in a variety of physical activities that support their healthy growth and development, are age-appropriate, enjoyable and safe, and occur in the context of family, child care, school, and community.

Infants should be physically active daily as a part of supervised indoor and outdoor experiences. Activities could include tummy time, reaching and grasping, pushing and pulling, and crawling.

Children in the early years should be physically active daily as part of play, games, sports, transportation, recreation, and physical education. For those who are physically inactive, increasing daily activity towards the recommended levels can provide some health benefits.

Following these physical activity guidelines may improve motor skills, body composition, and aspects of metabolic health and social development. These potential benefits far exceed the potential risks associated with physical activity.

These guidelines may be appropriate for infants, toddlers, and preschoolers with a disability or medical condition; however, their parents or caregiver should consult a health professional to understand the types and amounts of physical activity appropriate for them.

This recommendation places a high value on the advantages and benefits of physical activity that accrue throughout life. It also takes into consideration the preferences of practitioners to have guidance in this area for young children and the importance of setting targets for surveillance. Expert opinion and other international guidelines were used to com-

plement the evidence upon which these guidelines were developed.

For guidance on decreasing sedentary behaviour, please refer to the *Canadian Sedentary Behaviour Guidelines* (www.csep.ca/guidelines).

Guidelines

For healthy growth and development:

- Infants (aged <1 year) should be physically active several times daily – particularly through interactive floor-based play.
- Toddlers (aged 1–2 years) and preschoolers (aged 3–4 years) should accumulate at least 180 min of physical activity *at any intensity* spread throughout the day, including
  - A variety of activities in different environments.
  - Activities that develop movement skills.
  - Progression toward at least 60 min of energetic play by 5 years of age.

  More daily physical activity provides greater benefits.

Discussion

This paper presents the first Canadian Physical Activity Guidelines for the Early Years (aged 0–4 years). These guidelines were developed through a robust and rigourous process, are based on the best possible scientific evidence, and involved extensive input from a wide variety of experts and stakeholders. The guidelines are anchored to the scientific evidence and, where evidence was lacking, were informed by existing guidelines from other jurisdictions (American Academy of Pediatrics 2006; Australian Government 2010; Canadian Pediatric Society, Healthy Active Living Committee 2002; Hagan et al. 2008; National Association for Sport and Physical Education 2009; Start Active Stay Active 2011), consensus of the Guideline Development and Research Committee, and input received through the stakeholder consultation survey. A summary of physical activity guidelines for the early years from other jurisdictions is provided in Table 2. A more detailed report of the process used to develop the Canadian Physical Activity Guidelines for the Early Years can be found at http://www.csep.ca/english/view.asp?x=804.

The form and format of guidelines and recommendations from various agencies and jurisdictions differs substantially (Table 2). These new Canadian guidelines adhere to the form and format used by the CSEP for their other guidelines (Tremblay et al. 2011*a*, 2011*b*). In general the new Canadian guidelines are harmonized with those presented in Table 2; however, a few notable differences exist. First, the age groups are not consistent across agencies and jurisdictions. The Canadian ages were established to provide age groupings that are continuous from birth (early years aged 0–4 years; children aged 5–11 years; youth aged 12–17 years; adults aged 18–64; older adults aged 65 years and older) and are aligned with natural life milestones (e.g., start of school at age 5 years, end of secondary school at age 18 years, retirement at age 65 years). Second, the terminology used varies by agency and jurisdiction (e.g., early years, young children, preschoolers). The Canadian guidelines terminology was determined by expert group consensus and the on-line stakeholder survey. Third, the NASPE guidelines (National Association for Sport and Physical Education 2009) provide recommendations specific to structured and unstructured physical activity. Though this was discussed at length in the process of developing the Canadian guidelines, we resisted making such divisions because of an absence of available evidence upon which to base such recommendations. Messaging materials, however, will advise caregivers to achieve these recommendations through a combination of structured and unstructured movement opportunities. Finally, the Canadian Pediatric Society is in the process of updating their guidelines based on the evidence now available and will be retiring their prior statement (2002) once their new statement is published in 2012.

The new guidelines are evidence-based, realistic, and achievable; are widely endorsed by expert groups; and are broadly consistent with other jurisdictions. The Canadian Physical Activity Guidelines for the Early Years (aged 0–4 years) are consistent with the over-arching message of the existing Canadian physical activity guidelines that in general, "more is better"; thus, the new guidelines presented should be viewed as a minimal target.

The major difference between the school-aged children guidelines and those for the early years relates to physical activity intensity. The early years' guidelines recommend that toddlers and preschoolers accumulate at least 180 min of physical activity *at any intensity*, whereas the guidelines for school-aged children recommend they accumulate at least 60 min of *moderate- to vigorous-intensity* physical activity daily (Tremblay et al. 2011*a*). Some may perceive that the activity recommendations decrease from 180 to 60 min when children go to school; this is misguided. Indeed, the early years' recommendation to progress toward at least 60 min of energetic play (e.g., moderate- to vigorous-intensity physical activity) by 5 years of age brings the two guidelines together while respecting language and context suitable for the age groups. To reconcile the apparent difference in the recommended physical activity duration, school-aged children should meet their 60 min recommendation "above and beyond the incidental physical activities accumulated in the course of daily living" (Tremblay et al. 2011*a*), whereas this is embedded in the early years' recommendation.

Dissemination and implementation

The process for the development of physical activity guidelines for the early years is presented in this paper. The complete clinical practice guideline report and AGREE II assessment is also publicly available (http://www.csep.ca/english/view.asp?x=804). Further, the methodological process, systematic reviews, and final recommendations have been and will be shared at scientific meetings and conferences and are posted on the CSEP Web site (www.csep.ca).

These new guidelines are endorsed, promoted, and disseminated by the CSEP, ParticipACTION, Federal–Provincial–Territorial partners, stakeholder groups, and committed individuals. This dissemination process is guided by a set of content and dissemination recommendations put forth by a committee of experts including the guideline authors, health communication and marketing experts, and health behaviour change researchers. The steps to develop these recommendations paralleled the rigourous process used for the develop-

Table 2. Summary of physical activity guidelines/recommendations for the early years from other jurisdictions.

Jurisdiction (reference)	Physical Activity Guidelines
United States (American Academy of Pediatrics 2006)	**Infants and Toddlers (birth to 3 years)** • There is insufficient evidence to recommend exercise programs for infants and toddlers as a means of promoting increased physical activity. • Parents are encouraged to provide a safe, nurturing, and minimally structured play environment for their infant. • Infants and toddlers should be allowed to develop enjoyment of outdoor physical activity and unstructured exploration under the supervision of a responsible adult caregiver. **Preschool-aged children (4 to 6 years)** • Free play should be encouraged with emphasis on fun, playfulness, exploration, and experimentation while being mindful of safety and proper supervision. • Preschool-aged children should take part in unorganized play, preferably on flat surfaces with few variables and instruction limited to a show-and-tell format. • Appropriate activities might include running, swimming, tumbling, throwing, and catching. • Preschoolers should also begin walking tolerable distances with family members.
Australia (Australian Government 2010)	**Infants (birth to 1 year)** • For healthy development in infants, physical activity – particularly supervised floor-based play in safe environments – should be encouraged from birth. **Toddlers (1 to 3 years) and preschoolers (3–5 years)** • Toddlers and preschoolers should be physically active every day for at least 3 h, spread throughout the day.
Canada (Canadian Pediatric Society, Healthy Active Living Committee 2002)	**Physicians and health care professionals are encouraged to promote healthy active living for all family members by:** • Encouraging children and adolescents to increase the time that they spend on physical activities and sports by at least 30 min/day, with at least 10 min involving vigorous activities are those that increase the heart rate and respiratory rate and increase body temperature. To get added benefit, they should review their activity patterns every month and progressively increase their efforts. Once the first goal of increasing their current activities by at least 30 min is achieved, the goals should be reset to involve more time and to be more challenging. Events should include a wide variety of weight-bearing activities as part of sports, recreation, transportation, chores, work, planned exercise, and school-based physical education classes. Activities should be fun and unstructured for best compliance. • Advising parents to enrol their children in age- and developmentally appropriate sports and recreational activities.
United States (National Association for Sport and Physical Education 2009)	**Infants (birth to 12 months)** • Infants should interact with caregivers in daily physical activities that are dedicated to exploring movement and the environment. • Caregivers should place infants in settings that encourage and stimulate movement experiences and active play for short periods of time several times a day. • Infants' physical activity should promote skill development in movement. • Infants should be placed in an environment that meets or exceeds recommended safety standards for performing large-muscle activities. • Those in charge of infants' well-being are responsible for understanding the importance of physical activity and should promote movement skills by providing opportunities for structured and unstructured physical activity. **Toddlers (12 to 36 months)** • Toddlers should engage in a total of at least 30 min of structured physical activity each day. • Toddlers should engage in at least 60 min – and up to several hours – per day of unstructured physical activity and should not be sedentary for more than 60 min at a time, except when sleeping. • Toddlers should be given ample opportunities to develop movement skills that will serve as the building blocks for future motor skillfulness and physical activity. • Toddlers should have access to indoor and outdoor areas that meet or exceed recommended safety standards for performing large-muscle activities. • Those in charge of toddlers' well-being are responsible for understanding the importance of physical activity and promoting movement skills by providing opportunities for structured and unstructured physical activity and movement experiences.

Table 2 (*concluded*).

Jurisdiction (reference)	Physical Activity Guidelines
United Kingdom (Start Active Stay Active 2011)	**Preschoolers (3 to 5 years)** • Preschoolers should accumulate at least 60 min of structured physical activity each day. • Preschoolers should engage in at least 60 min – and up to several hours – of unstructured physical activity each day, and should not be sedentary for more than 60 min at a time, except when sleeping. • Preschoolers should be encouraged to develop competence in fundamental motor skills that will serve as the building blocks for future motor skillfulness and physical activity. • Preschoolers should have access to indoor and outdoor areas that meet or exceed recommended safety standards for performing large-muscle activities. • Caregivers and parents in charge of preschoolers' health and well-being are responsible for understanding the importance of physical activity and for promoting movement skills by providing opportunities for structured and unstructured physical activity. **Infants who are not yet walking** • Physical activity should be encouraged from birth, particularly through floor-based play and water-based activities in safe environments. **Early years (under 5 years) who are capable of walking** • Children of preschool age who are capable of walking unaided should be physically active daily for at least 180 min (3 h), spread throughout the day. • Individual physical and mental capabilities should be considered when interpreting the guidelines.

Note: Guidelines related to sedentary behaviours are not listed here and can be found in the Canadian sedentary behaviour guidelines for the early years paper (Tremblay et al. 2012).

ment of the physical activity guidelines themselves. The background literature to inform and develop the messaging recommendations for the new guidelines can be found elsewhere (Latimer et al. 2010; Rhodes and Pfaeffli 2010; www.csep.ca). As developing public facing messaging and dissemination materials take a great deal of time and resources, the CSEP will continue to work with stakeholders over the coming months (and years) to fill any gaps that currently exist. These materials will include information sheets (see Appendix A) for health professionals and caregivers, posters, vignettes and motivational stories, information webinars, and ebooks. All material prepared by the CSEP will be available on the CSEP Web site and, when possible, promoted through partner groups and stakeholders.

Updating the guidelines

Updating these guidelines in the future will be important and necessary to ensure they remain true to the most current evidence. Because of the amount of work required to update each systematic review, it is difficult to update the guidelines for all age groups simultaneously. Therefore, it is recommended that the guidelines for the different age groups be done in a cyclical fashion such that each set of guidelines is updated every 5 years. However, if important evidence emerges in the interim between updates, leaders will work to make modifications in a more expeditious fashion. Efforts to coordinate updates with other countries and jurisdictions are recommended to reduce duplication of efforts and harmonize physical activity guidelines.

Surveillance

The surveillance of physical activity in the early years is very sparse in Canada, particularly for nationally representative samples. The National Longitudinal Survey of Children and Youth (NLSCY; Statistics Canada: http://www.statcan.gc.ca/imdb-bmdi/instrument/4450_Q2_V7-eng.pdf) collected information on the physical activity behaviours of children from ages 0–17 years, though this survey is no longer continuing. The Canadian Health Measures Survey (CHMS; Statistics Canada: http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=5071&lang=en&db=imdb&adm=8&dis=2) cycle 2 (2009–2011) used accelerometers to objectively measure physical activity in 3–4 year-olds (and older children). The CHMS data will allow for the direct assessment of physical activity on this nationally representative sample of children and will provide information on how many preschoolers are meeting these new guidelines. Future waves of the Physical Activity Monitor (PAM; Canadian Fitness and Lifestyle Research Institute: http://www.cflri.ca/pub_page/105) could accommodate parental-reported physical activity behaviours in the early years, though the validity of such parent-reported physical activity is unclear.

For recent, specific examples of physical activity surveillance activities in the early years see the Active Healthy Kids Canada Report Cards (Active Healthy Kids Canada 2008, 2009, 2010, 2011). There are clear limitations and gaps in physical activity surveillance in Canada (Katzmarzyk and Tremblay 2007). Additional efforts at monitoring the physical activity behaviour of children in the early years are needed and it is hoped that the release of these guidelines will provoke such changes.

Future research

The literature in this field is at an early stage of development with more research required before a complete understanding of the relationship between the frequency, intensity, time, and type of physical activity and health outcomes in the early years is available. These guidelines were developed

based on the best available evidence, and while this evidence was not as comprehensive as desired, the clear demand among Canadians for healthy active living guidance for the early years was a strong incentive to develop the guidelines now. The authors hope the existence of guidelines for children in this age group will encourage further research; even research to challenge these guidelines. We propose that research on infants, toddlers, and preschoolers is needed

- To understand the frequency, intensity, duration, and type (mode) of activity associated with better health indicators and improvements in health indicators.
- To assess the safety and efficacy of these guidelines for children with special needs (i.e., living with chronic disease or disability).
- To understand the interaction and relative effects of physical activities of various intensities and sedentary behaviours (e.g., sitting or watching television) of various durations.
- To understand the most effective ways to communicate the new guidelines to intermediaries and the general public.
- To monitor adverse effects related to the recommended levels of physical activity reported herein.
- To determine the best physical activity methods and measures to use for the early years.
- To establish appropriate and responsive health indicators (or surrogate indictors) in the early years.
- Using rigorous research designs
  - On structured, longitudinal, population-based samples looking at direct (objective) and standardized measures of physical activity and age-specific health outcomes while accounting for covariates such as age, gender, socio-economic status, and ethnicity.
  - For higher quality randomized controlled trials in this age group (i.e., larger and more diverse samples using direct measures and reporting outcomes important for healthy growth and development).

Sedentary behaviours

Other physical activity guidelines or recommendations for the early years listed in Table 2 included statements regarding reducing sedentary behaviours, as did the earlier Canadian Physical Activity Guidelines for Children (Health Canada and the Canadian Society for Exercise Physiology 2002). However, with emerging evidence that the biology (and therefore health consequences) of sedentary behaviour is separate and distinct from physical activity and exercise (Tremblay et al. 2010*c*), we decided to produce separate guidelines, based on separate systematic reviews, for physical activity and sedentary behaviours, similar to what the CSEP did for school-aged children (Tremblay et al. 2011*a*, 2011*b*). The "sister" paper on the first Canadian Sedentary Behaviour Guidelines for the Early Years (aged 0–4 years) is also included in this journal issue (Tremblay et al. 2012).

Summary

This paper provides a brief overview of the process and outcomes for the development of the first Canadian Physical Activity Guidelines for the Early Years (aged 0–4 years). These guidelines have been developed through partnerships with many organizations to present the best evidence on the relationship between physical activity and various health indicators. The Guideline Development and Research Committee ensured that the process to develop the guidelines has been rigourous, transparent, inclusive, and thoroughly documented.

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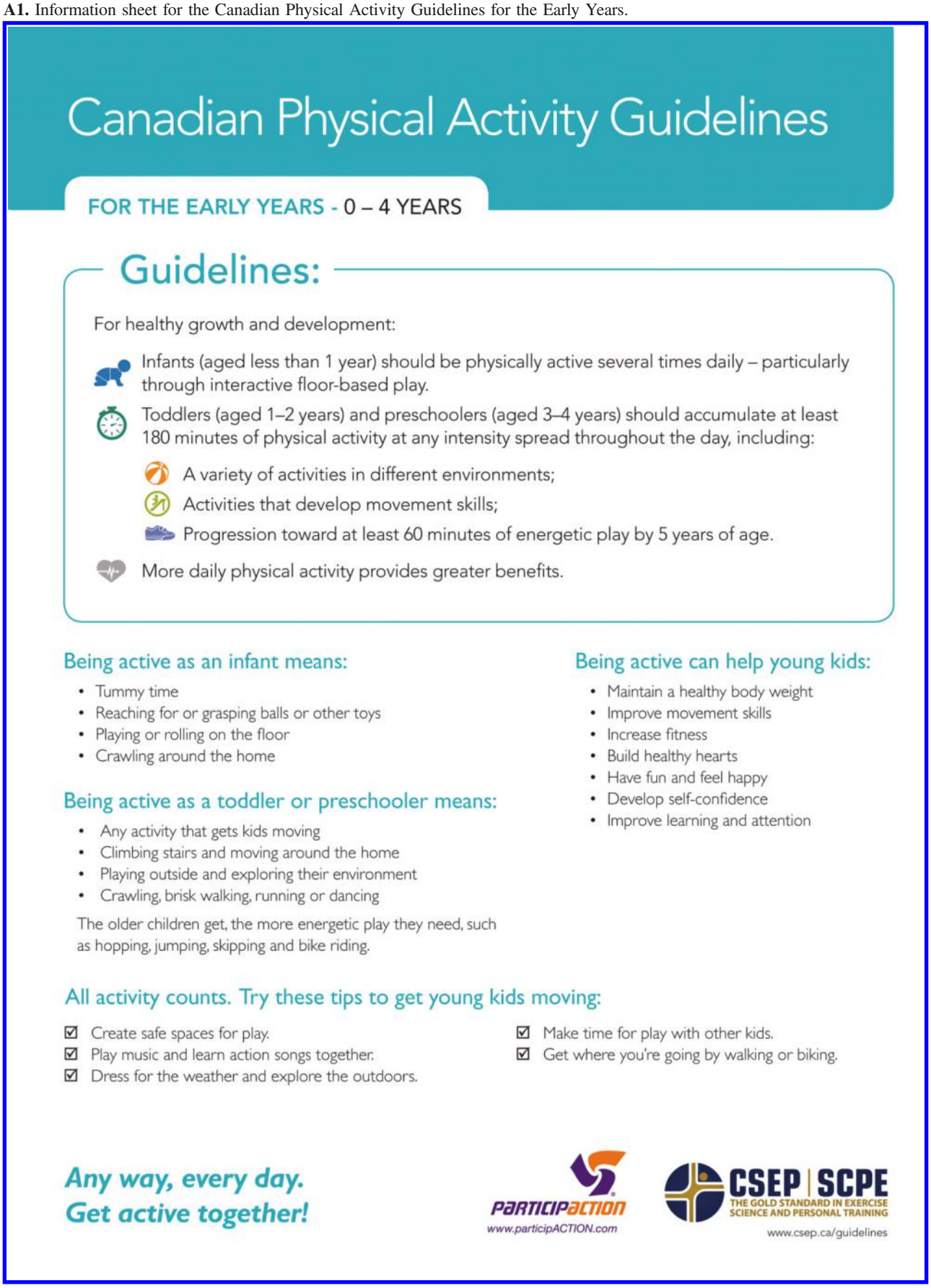
Appendix A

Appendix A appears on the following page.

Fig. A1. Information sheet for the Canadian Physical Activity Guidelines for the Early Years.



Canadian Physical Activity Guidelines

FOR THE EARLY YEARS - 0 – 4 YEARS

Guidelines:

For healthy growth and development:

- Infants (aged less than 1 year) should be physically active several times daily – particularly through interactive floor-based play.
- Toddlers (aged 1–2 years) and preschoolers (aged 3–4 years) should accumulate at least 180 minutes of physical activity at any intensity spread throughout the day, including:
  - A variety of activities in different environments;
  - Activities that develop movement skills;
  - Progression toward at least 60 minutes of energetic play by 5 years of age.
- More daily physical activity provides greater benefits.

Being active as an infant means:

- Tummy time
- Reaching for or grasping balls or other toys
- Playing or rolling on the floor
- Crawling around the home

Being active as a toddler or preschooler means:

- Any activity that gets kids moving
- Climbing stairs and moving around the home
- Playing outside and exploring their environment
- Crawling, brisk walking, running or dancing

The older children get, the more energetic play they need, such as hopping, jumping, skipping and bike riding.

Being active can help young kids:

- Maintain a healthy body weight
- Improve movement skills
- Increase fitness
- Build healthy hearts
- Have fun and feel happy
- Develop self-confidence
- Improve learning and attention

All activity counts. Try these tips to get young kids moving:

- ☑ Create safe spaces for play.
- ☑ Play music and learn action songs together.
- ☑ Dress for the weather and explore the outdoors.
- ☑ Make time for play with other kids.
- ☑ Get where you're going by walking or biking.

Any way, every day.
Get active together!

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