GUIDELINES ON PHYSICAL ACTIVITY, SEDENTARY BEHAVIOUR AND SLEEP FOR CHILDREN UNDER 5 YEARS OF AGE

World Health Organization

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WHO guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age

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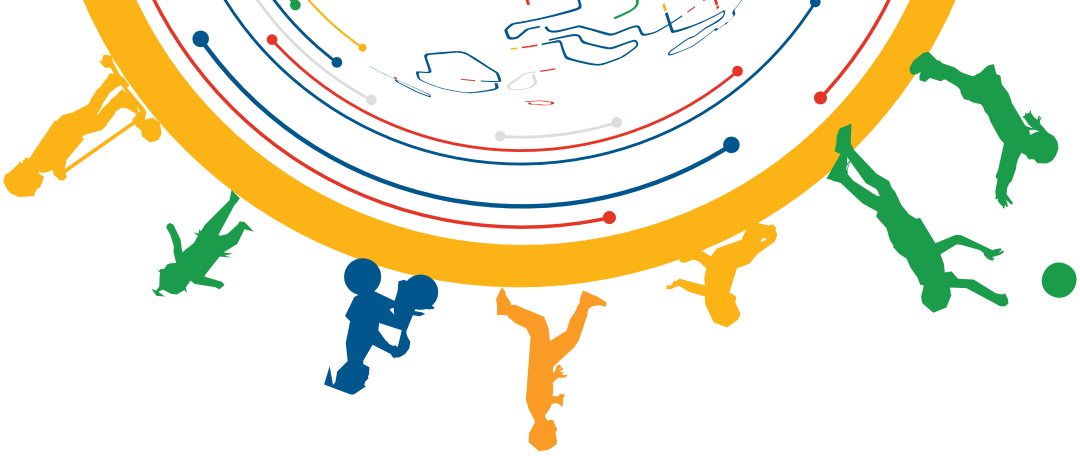
GLOSSARY OF TERMS

Term	Abbreviation	Definition
Adiposity		Excessive fat accumulation in the body (overweight, obesity), as measured by BMI, BMI-for-age, BMI z-score, skinfold thickness, body fat mass.
Body composition		The proportion of fat and fat-free mass in the body. This can be measured as percentage body fat. Body mass index (see below) and waist circumference are proxies for body composition and in most situations, are good indicators of health risk associated with excess adiposity.
Body mass index	BMI	Weight (kg) / height $(m)^2$
	BMI-for-age or BMI z-score	BMI adjusted for age, standardized for children. BMI standard deviation scores are measures of relative weight adjusted for child age and sex. Given a child's age, sex, BMI, and an appropriate reference standard, a BMI z-score (or its equivalent BMI-for-age percentile) can be determined.
Cardiometabolic health		The interplay of blood pressure, blood lipids, glucose and insulin on health.
Cognitive development		The process of learning, memory, attention, concentration and language development.
Disability		Term for impairments, activity limitations and participation restrictions.
Emotional regulation		An individual's ability to manage and respond to emotional experiences such as stress, anxiety, mood, temperament, hyperactivity/impulsivity.
Energetic play		Active play that is equivalent to moderate-to-vigorous physical activity, when children get out of breath and feel warm. This may take many forms and may involve other children, caregivers, objects or not.
Exercise		Physical activity that is planned, structured, generally repetitive and has purpose.
Fitness		A measure of the body's ability to function efficiently and effectively in work and leisure activities and includes, for example, physical fitness and cardiorespiratory fitness.
Floor-based play		Supervised play for infants, where children move on the floor and develop motor skills.
Infant		Child aged less than one year, for the purposes of studies aged 0–11.9 months.
Interactive activities		Activities with a parent or caregiver that do not involve screens as a mode of entertainment. These can include reading, singing, storytelling, colouring, block building, cutting out, puzzles and games.
Interactive play		*See "Play".* Interactive play is play with a parent or caregiver where the child and adult/older child interact and engage in play for both cognitive and motor learning.
Light-intensity physical activity	LPA	LPA is equivalent to 1.5–4 METs in children, i.e., activities with energy cost 1.5 to 4.0 times the energy expenditure at rest for that child. For young children, this can include slow walking, bathing, or other incidental activities that do not result in the child getting hot or short of breath.
Metabolic equivalent of task	MET	The metabolic equivalent of task, or simply metabolic equivalent, is a physiological measure expressing the energy cost (or calories) of physical activities. One MET is the energy equivalent expended by an individual while seated at rest.



Term	Abbreviation	Definition
Moderate to vigorous intensity physical activity	MVPA	Moderate PA is equivalent to 4–7 METs in children, i.e., 4–7 times resting energy expenditure at rest for that child. Vigorous PA is equivalent to >7 METs. For young children, this can include brisk walking, cycling, running playing ball games, swimming, dancing etc. during which the child gets hot and breathless. *See "Energetic play".*
Motor development		Development of a child's musculoskeletal system and acquisition of gross motor skills (sometimes referred to as fundamental movement skills), and fine motor skills, including object control.
Nap		Period of sleep, usually during the daytime in addition to usual night time sleep.
Non-screen-based sedentary time		Usually refers to time spent sitting, not using screen-based entertainment. For young children, this includes lying on a mat, sitting in a high-chair, pram or stroller with little movement, sitting reading a book or playing a sedate game.
Physical activity	PA	Movement of the body that uses energy over and above resting. For young children, this can include walking, crawling, running, jumping, balancing, climbing in, through and over objects, dancing, riding wheeled toys, cycling, jumping rope etc.
Play		Play is defined as being for its own sake (without a specific goal), voluntary, enjoyed by participants and imaginative. It can be solitary or social, and with or without objects. Young children acquire and consolidate developmental skills through playful interactions with people and objects.
Pre-school child		Child aged 3 to under 5 years (36.0–59.9 months).
Prone position		Child lying on their front. *See "tummy time".*
Psychosocial health		Include mental, emotional and social dimensions of health.
Restrained		Time when an infant or child is strapped or harnessed in a pram, stroller, high chair, or on an adult's body (front or back) and unable to move freely.
Sedentary screen time		Time spent passively watching screen-based entertainment (TV, computer, mobile devices). Does not include active screen-based games where physical activity or movement is required.
Sedentary behaviour		Any waking behaviour characterized by an energy expenditure ≤1.5 metabolic equivalents (METs), while in a sitting, reclining or lying posture. For children under 5 years of age includes time spent restrained in car seat, high-chair, stroller, pram or in a carrying device or on a caregiver's back. Includes time spent sitting quietly listening to a story.
Sleep behaviour		Duration and timing of sleep. For children under 5 years of age includes both at night and daytime naps.
Toddler		Child aged 1 to under 3 years (12.0–35.9 months).
Tummy time		Time an infant spends lying on their front (in prone position) while awake with unrestricted movement of limbs.

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Systematic reviews of evidence were led by Valerie Carson, Veronica Poitras, Jean-Philippe Chaput and Nicholas Kuzik. Additional literature searches in all official WHO languages conducted by Casey Gray, João Pereira, Mark Tremblay, Zhiguang Zhang.

Summaries of evidence and GRADE tables were updated in December 2017 by Casey Gray, Mark Tremblay and the Healthy Active Living and Obesity Research Group at the Children's Hospital of Eastern Ontario Research Institute, Ottawa, Canada.

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EXECUTIVE SUMMARY

Physical inactivity has been identified as a leading risk factor for global mortality and a contributor to the rise in overweight and obesity. Early childhood is a period of rapid physical and cognitive development and a time during which a child's habits are formed and family lifestyle habits are open to changes and adaptations. To meet daily physical activity time recommendations, particularly in children, the pattern of overall activity across a 24-hour period needs to be considered, since the day is made up of sleep time, sedentary time and light, moderate- or vigorous-intensity physical activity.

The primary audiences for these guidelines are policy makers in ministries of health, education and /or social welfare, working in high- as well as low- and middle-income countries, persons working in non-governmental organizations and early childhood development services, and those providing advice and guidance to caregivers, such as community or family nurses or doctors, paediatricians or occupational therapists. These guidelines are intended to assist officials as they develop national plans to increase physical activity, reduce sedentary time and improve time spent sleeping in young children though guidance documents and define critical elements of childcare services and pre-service training for health care and early childhood development professionals.

The overall goals of these guidelines are to provide recommendations on the amount of time in a 24-hour day that young children, under 5 years of age, should spend being physically active or sleeping for their health and wellbeing, and the maximum recommended time these children should spend on screen-based sedentary activities or time restrained. By providing this guidance, the recommendations fill a gap in the WHO recommendations on physical activity, as children under 5 years of age were not included in the Global recommendations on physical activity for health in 2010 and will also contribute to the implementation of the recommendations of the Commission on Ending Childhood Obesity and the Global Action Plan on Physical Activity 2018-2030. These guidelines also contribute to the broader Nurturing care for early childhood development framework. Nurturing care encompasses health, nutrition and safety needs, as well as early learning opportunities. These guidelines do not specifically address the physical activity, sedentary and sleep needs of children with disabilities or chronic disease. The recommendations may be appropriate for children with disabilities or chronic disease, but parents and caregivers should seek additional advice from health professionals, or those involved in providing early intervention services for a child.

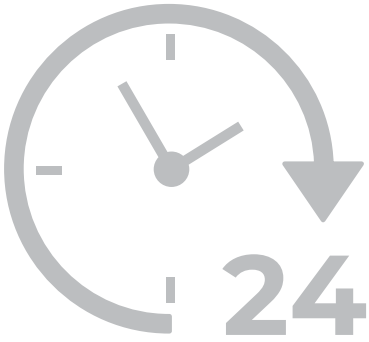
The development of these guidelines was in keeping with the WHO Handbook on development of guidelines and commenced in 2017 with the formation of a Steering Group. The Guideline Development Group (GDG), composed of technical experts and relevant stakeholders from all six WHO regions, met in November 2017 to decide on the critical questions and outcomes to be assessed. Existing, recent, high-quality systematic reviews were updated, and the search criteria expanded to include all six official languages during 2017–2018. GRADE profiles were prepared using methodology recommended by the Guidelines Review Committee, with the support of a GRADE methodologist.

The GDG met in Ottawa, Canada in April 2018 to review the summaries of evidence for the critical outcomes, the quality of the evidence, risk and benefits of implementing the recommendations, values, preferences, feasibility, acceptability, equity and resource implications. Where there was no evidence available to inform these aspects, the GDG expertise informed the discussions. The recommendations were developed with full consensus of the group. The recommendations are summarized below, and GRADE tables are available in Web Annex Evidence Profiles. The recommendations will be updated within ten years, unless further research in the area provides additional evidence to warrant an earlier update. Practical tools to support dissemination, adaptation and implementation of the recommendations will be developed.

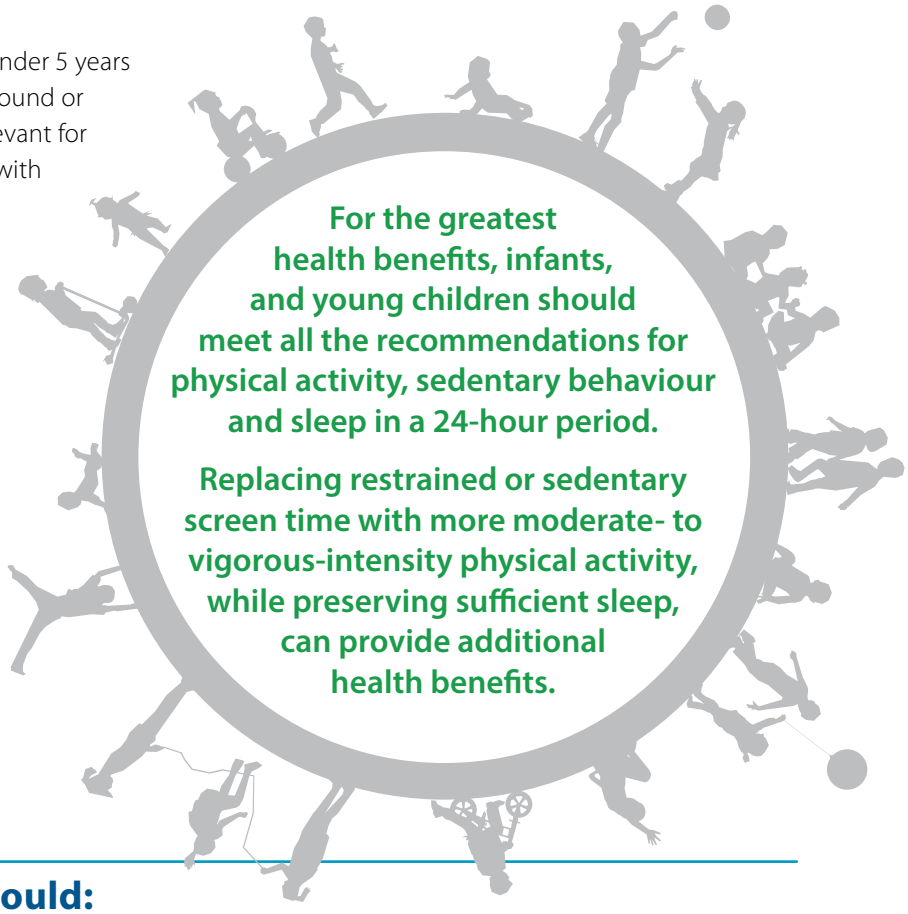
Available online at https://apps.who.int/iris/handle/10665/311663

RECOMMENDATIONS FOR 24-HOUR PHYSICAL ACTIVITY, SEDENTARY BEHAVIOUR AND SLEEP FOR CHILDREN UNDER 5 YEARS OF AGE

These guidelines are for all healthy children under 5 years of age, irrespective of gender, cultural background or socio-economic status of families and are relevant for children of all abilities; caregivers of children with a disability or those with a medical condition, however, may seek additional guidance from a health professional.



In a 24-hour day,



For the greatest health benefits, infants, and young children should meet all the recommendations for physical activity, sedentary behaviour and sleep in a 24-hour period.

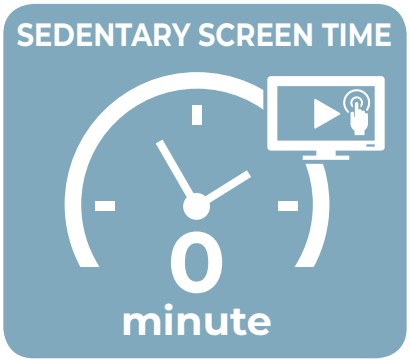
Replacing restrained or sedentary screen time with more moderate- to vigorous-intensity physical activity, while preserving sufficient sleep, can provide additional health benefits.

infants (less than 1 year) should:

Be physically active several times a day in a variety of ways, particularly through interactive floor-based play; more is better. For those not yet mobile, this includes **at least 30 minutes in prone position** (tummy time) spread throughout the day while awake.

Not be restrained for more than 1 hour at a time (e.g., prams/strollers, high chairs, or strapped on a caregiver's back). Screen time is not recommended. When sedentary, engaging in reading and storytelling with a caregiver is encouraged.

Have 14–17h (0–3 months of age) **or 12–16h** (4–11 months of age) **of good quality sleep**, including naps.

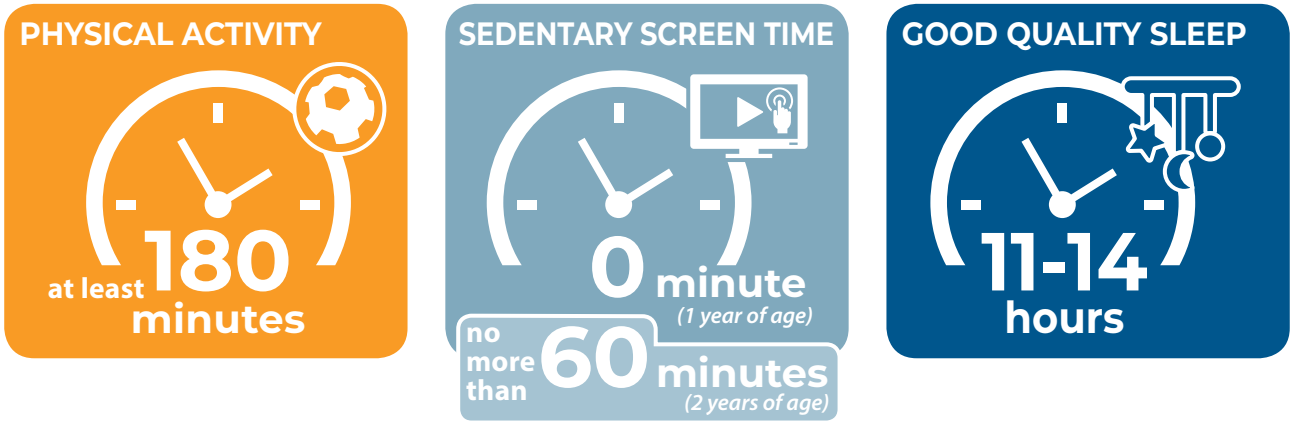


children 1–2 years of age should:

Spend at least 180 minutes in a variety of types of physical activities at any intensity, including moderate- to vigorous-intensity physical activity, spread throughout the day; more is better.

Not be restrained for more than 1 hour at a time (e.g., prams/strollers, high chairs, or strapped on a caregiver's back) or sit for extended periods of time. **For 1-year-olds, sedentary screen time (such as watching TV or videos, playing computer games) is not recommended**. **For those aged 2 years, sedentary screen time should be no more than 1 hour; less is better.** When sedentary, engaging in reading and storytelling with a caregiver is encouraged.

Have 11–14h of good quality sleep, including naps, with regular sleep and wake-up times.

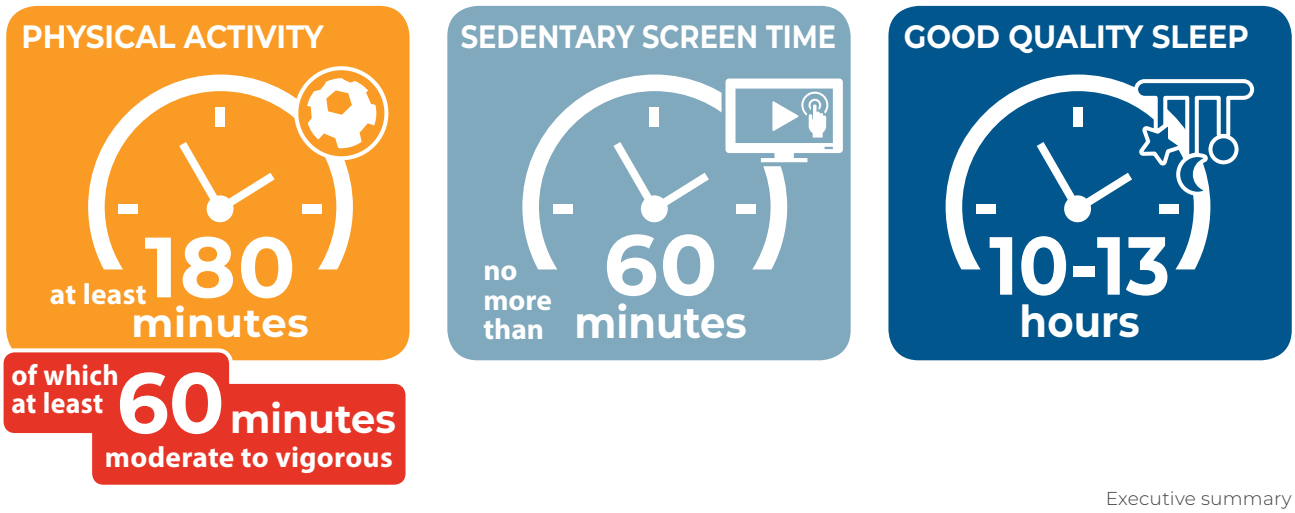


children 3–4 years of age should:

Spend at least 180 minutes in a variety of types of physical activities at any intensity, of which at least 60 minutes is moderate- to vigorous-intensity physical activity, spread throughout the day; more is better.

Not be restrained for more than 1 hour at a time (e.g., prams/strollers) or sit for extended periods of time. **Sedentary screen time should be no more than 1 hour; less is better.** When sedentary, engaging in reading and storytelling with a caregiver is encouraged.

Have 10–13h of good quality sleep, which may include a nap, with regular sleep and wake-up times.



INTRODUCTION

BACKGROUND

Physical inactivity has been identified as a leading risk factor for global mortality and a contributor to the rise in overweight and obesity. In 2010 WHO published Global recommendations on physical activity for health *(1)* which detailed interventions for the primary prevention of noncommunicable diseases (NCDs) through physical activity at population level. Estimates from 2012 indicate that not meeting current physical activity recommendations are responsible for more than 5 million deaths globally each year *(2)*. Although we know that over 23% of adults and 80% of adolescents are not sufficiently physical active *(3)*, there are currently no comparable data for younger children.

Recommendations have been established for three population-age groups *(5-17, 18-64* and over 65 years), but up until this point did not include children under the age of 5 years. The recommended physical activity for children 5–17 years old to improve cardiorespiratory and muscular fitness, bone health, cardiovascular and metabolic health biomarkers and reduce symptoms of anxiety and depression is an accumulation of at least 60 minutes of moderate- to vigorous-intensity physical activity (see definition of terms in the glossary) each day, through play, games, sports, transportation, recreation and physical education, in the context of family, school and community activities. Amounts greater than 60 minutes would provide additional health benefits and vigorous-intensity activities, including those that strengthen muscle and bone, should be incorporated at least three times per week.

Early childhood (under 5 years of age) is a period of rapid physical and cognitive development and a time during which a child's habits are formed and family lifestyle routines are open to changes and adaptations. Lifestyle behaviours developed in early life can influence physical activity levels and patterns throughout the life course *(4)*. Active play and opportunities for structured and unstructured physical activity can contribute to the development of motor skills and exploration of the physical environment.

To meet daily physical activity time recommendations, particularly in children, the pattern of overall 24-hour activity needs to be considered, since the day is made up of sleep time, sedentary time and light-, moderate- and vigorous-intensity physical activity. Sedentary behaviours, whether riding motorized transport rather than walking or cycling, sitting at a desk in school, watching TV or playing inactive screen-based games are increasingly prevalent *(5)* and associated with poor health outcomes *(6)*. Sleep time is also know to influence health outcomes and short sleep duration is associated with overweight and obesity in childhood *(7)* and adolescence *(8)*, as well as mental health issues amongst adolescents *(8)*. Chronic insufficient sleep up to 7 years of age has been associated with increased adiposity in later childhood and adolescence *(9)*.

RATIONALE

Improving the physical activity, sedentary and sleep time behaviours of young children will contribute to their physical health, reduce the risk of developing obesity in childhood and the associated NCDs in later life and improve mental health and wellbeing. These health outcomes will contribute to the attainment of the Sustainable Development Goal (SDGs) targets 2.2 (to end all forms of malnutrition) and 3.4 (to reduce by one-third premature mortality from NCDs).

The important interactions between physical activity, sedentary behaviour and adequate sleep time on physical and mental health and wellbeing were recognized by the Commission on Ending Childhood Obesity, that called for clear guidance on physical activity, sedentary behaviour and sleep in young children in their recommendation 4.12 *(10)*. Healthy physical activity, sedentary behaviour and sleep habits are established early in life, providing an opportunity to shape habits through childhood, adolescence and into adulthood *(4)*.

Physical activity in children under 5 years of age is favourably associated with health indicators such as adiposity, bone and skeletal health, cardiometabolic health, cognitive and motor skills development *(11)*. It is increasingly recognized that too much sedentary time can have detrimental effects on health *(12)* and there are recommendations to limit the exposure to screens in young children in a number of countries (Australia *(13)*, Canada *(14)*, United States of America *(15)*, New Zealand *(16)*). Sleep is essential for cognitive, physical and psychosocial development *(17)*, particularly in young children and is a common cause for concern amongst parents, who seek guidance from health professionals on this topic. There is however, no global guidance on specific frequency, intensity and duration of physical activity, appropriate amount of screen time and optimal duration of sleep required for health in this age group.

Given the new evidence available on the health effects of sedentary and sleep time, these WHO recommendations on physical activity for children under 5 years of age consider not only the separate but also the cumulative and synergistic effects of physical activity, sedentary behaviour and sleep on health outcomes.

In 2017, New Zealand published guidance for movement and sleep in children under 5 years of age *(18)* and a number of other countries have followed suit. The national health authorities in Canada and Australia launched comprehensive 24-hour movement (physical activity, sedentary and sleep time) guidelines for children and youth *(19)* and young children *(20, 21)*, based upon systematic reviews of the literature with stakeholder feedback on draft guidelines through survey and focus group discussions *(21, 22)*. The Consensus Panel that is developing guidelines on movement behaviours for the 0–5-year age group in South Africa recently met to adapt the Canadian and Australian guidelines[1] and considered early results from assessment of children's physical activity, sedentary and sleep patterns (PhD submissions, currently under review).

WHO has developed these guidelines on physical activity, sedentary behaviour and sleep, as requested by the Commission on Ending Childhood Obesity, building upon the high quality systematic reviews that were conducted to inform the Canadian and Australian guidelines. The WHO guideline process is a rigorous, systematic and transparent process for the development of recommendations that takes into consideration the strength of the evidence as well as values and preferences, benefits and harms, equity and human rights.

[1] *Report available online at www.wits.ac.za/media/wits-university/faculties-and-schools/health-sciences/research-entities/documents/EYG%20consensus%20panel%20meeting%20notes.pdf (accessed 05/03/2019)*

SCOPE AND PURPOSE OF GUIDELINES

The overall goals of these guidelines are to provide recommendations on the amount of time in a 24-hour day that young children, under 5 years of age, should spend being physically active or sleeping for their health and wellbeing, and the maximum recommended time these children should spend on screen-based sedentary activities or restrained. The guidelines do not address how these durations of activity, sedentary time or sleep should be achieved. Additional resources and tools will be developed to address these issues and support early childhood educators, carers and parents to help children achieve these recommendations.

By providing this guidance, the recommendations fill a gap in the WHO recommendations on physical activity, as children under 5 years of age were not included in the Global recommendations on physical activity for health in 2010 *(1)* and will also contribute to the implementation of the recommendations of the Commission on Ending Childhood Obesity *(10)*. These guidelines also contribute to the broader Nurturing care for early childhood development framework *(23)*. Nurturing care encompasses health, nutrition and safety needs, as well as early learning opportunities. These guidelines on physical activity, sedentary behaviour and sleep set out the recommended time to be spent on each of these behaviours, recognizing that:

a. the combined recommendations do not account for every hour in a child's day;

b. physical activity in young children is largely expressed in the form of active play;

c. quiet play (play that is not energetic and so not defined as physical activity and may be done while sedentary) is very important for development and can take many forms; and

d. adequate sleep is important for children to benefit from early childhood development opportunities.

As such, these guidelines do not aim to address all aspects of early childhood development, but rather contribute to this broader context through recommendations specifically on physical activity, sedentary screen-time and time spent restrained or sitting and sleep.

These guidelines do not specifically address the physical activity, sedentary and sleep needs of children with disabilities or chronic disease. The recommendations may be appropriate for children with disabilities or chronic disease, but parents and caregivers should seek additional advice from health professionals, or those involved in providing early intervention services for a child *(24)*. Early identification of developmental delays or disabilities will enable care providers to assess and plan for early interventions for a child with disability that can include encouraging physical activity, appropriate sedentary or screen-time and sleep as part of programmes and services *(25)*.

Target audience

The key audiences for these guidelines are:

a. Policy makers in ministries of health, education and /or social welfare, working in high as well as low- and middle-income countries, who formulate country-specific guidelines and who plan family, childcare or community-based intervention programmes.

b. Persons working in non-governmental organizations and early childhood development services can use the guidelines to define critical elements of childcare services.

c. Those providing advice and guidance to caregivers, such as community or family nurses or doctors, paediatricians or occupational therapists, can use the guidelines to inform the content of their advice on these topics.

These guidelines are intended to assist officials as they develop national plans to increase physical activity, reduce sedentary time and improve sleep patterns in young children through guidance documents. The recommendations of these guidelines should be included in pre-service training for health care and early childhood education and care and child development professionals.

Scope of guidelines and questions of interest

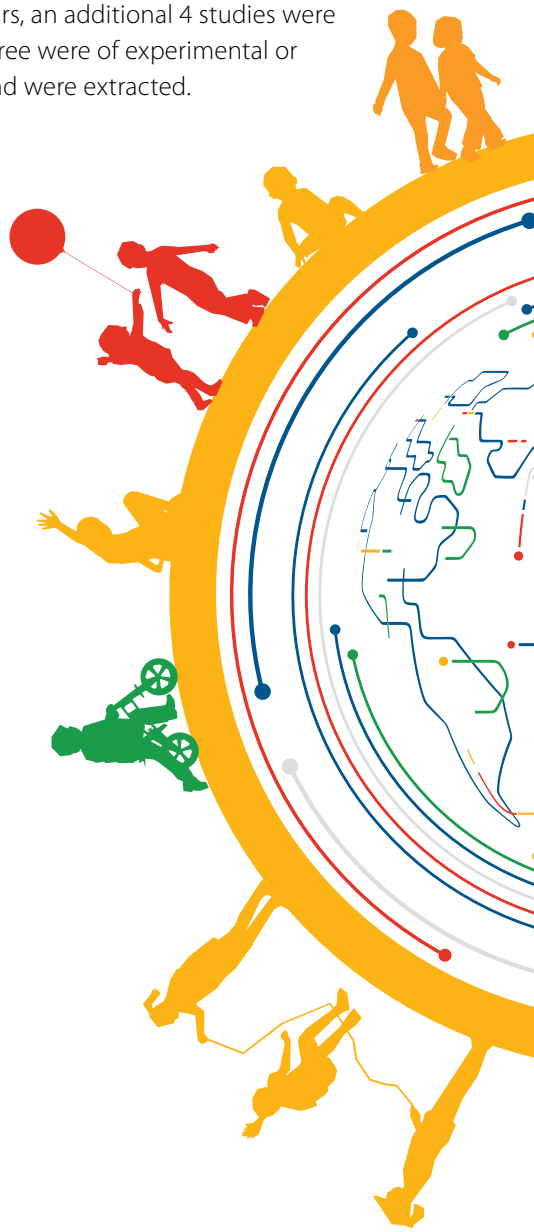
The Guideline Development Group (GDG) decided on the scope of the guidelines and PICO (Population, Intervention, Comparison, Outcome) questions at their first meeting. They requested that the available systematic reviews be updated to reflect recent data and explore sources of data in all six WHO official languages.

Systematic reviews

The systematic reviews conducted up to April 2016 for the Canadian 24-Hour Movement Guidelines for the Early Years were led by Valerie Carson *(26)*, Veronica Poitras *(27)*, Jean-Philippe Chaput *(28)* and Nicholas Kuzik *(29)* under the overall leadership of Dr Mark Tremblay. The search strategies were developed and peer-reviewed by experts in systematic reviews. The following databases were search in April 2016: MEDLINE, SPORTDiscus, EMBASE, PsycINFO, CENTRAL to identify studies that were peer-reviewed, written in English or French and met the systematic review criteria (apparently healthy children aged under 5 years of age, objectively or subjectively measured physical activity/sedentary time/screen time/ sleep duration reporting critical outcomes of adiposity, motor development, psychosocial health, cognitive development, growth, cardiometabolic health and fitness and additional outcomes of bone/skeletal health and risk of injuries). These systematic reviews were registered with the International Prospective Register of Ongoing Systematic Reviews and used the GRADE framework to determine the quality of evidence. Dr Anthony Okely oversaw the updating of these systematic reviews for randomized controlled trials and cohort studies for critical indicators only, for the Australian guidelines through to March 2017, using the same search criteria and methods. This resulted in the addition of one study on physical activity, three on sedentary behaviour, three on sleep and none on integrated behaviours *(21)*. The GDG reviewed the existing systematic reviews and requested that these be updated to include high quality studies published since the Australian update and those identified in all official WHO languages to reflect the final PICO questions.

Additional literature searches, using the same search terms and methods as the original systematic reviews in French and Spanish were conducted by Casey Gray and Mark Tremblay, in Portuguese by João Pereira and in Arabic, Chinese and Russian by Zhiguang Zhang. Summaries of the evidence and GRADE tables were updated in December 2017 by Casey Gray, Mark Tremblay and the Healthy Active Living and Obesity Research Group at the Children's Hospital of Eastern Ontario Research Institute, Ottawa, Canada *(30)*.

For physical activity, fifteen additional studies were identified, of which only six were of experimental or longitudinal design and were extracted. For sedentary behaviour, an additional 15 studies were identified, of which only four were longitudinal studies (no experimental studies) that were extracted. For sleep an additional 11 studies were identified, of which only five were of longitudinal study design and were extracted. For integrated physical activity, sedentary and sleep (movement) behaviours, an additional 4 studies were identified, of which three were of experimental or longitudinal design and were extracted.



Going from evidence to recommendations

The GDG employed the GRADE Evidence to Decisions (EtD) framework for generating question specific recommendations. The EtD framework is a systematic, structured and transparent approach to decision making. The framework employs explicit criteria for generating guideline recommendations in light of research evidence, certainty of evidence, and where required, expert opinion and topical knowledge from the perspective of the target audience. The criteria elicit judgments about the balance between the observed evidence of desirable and undesirable outcomes, overall certainty of evidence, relative values of patients for desirable and undesirable outcomes, resource use (cost considerations) where applicable, concerns about potential for inequities in health, acceptability and feasibility of recommendations.

The GDG considered the body of evidence in totality for each recommendation for all critical and important outcomes. Given the nature of the topic, studies differed widely in the specific exposure/intervention and outcome measurements for the same overall exposure/intervention and outcome domain. Findings also differed given these differences with no specific pattern. As such, it was not possible to apply the classic GRADE approach focusing on specific categories of study design only or exclusively on the highest quality evidence ignoring the diversity of ways in which the intervention/exposure and outcome were measured and the variability in findings. The panel, however, was conservative in rating the quality of evidence for each recommendation.

The GDG considered as favourable or desirable health outcomes such as reduced adiposity (BMI-for-age or other measures of childhood overweight or obesity), increased motor skills and improvement in the measures of cognitive development, psychosocial health and emotional regulation. Unfavourable or undesirable outcomes were increased adiposity (BMI-for-age or other measures of childhood overweight or obesity), decreased motor skills and deterioration in the measures of cognitive development, psychosocial health and emotional regulation.

The GDG also considered values and preferences of those affected by the guidelines (in this case parents and caregivers); the resource implications of the recommendations; the impact on health equity; the acceptability and feasibility of the recommendations. Further details are available on pages 15-16.

RECOMMENDATIONS

PHYSICAL ACTIVITY

RECOMMENDATIONS

- **Infants (less than 1 year)**
  should be physically active several times a day in a variety of ways, particularly through interactive floor-based play; more is better. For those not yet mobile, this includes at least 30 minutes in prone position (tummy time) spread throughout the day while awake.
- **Children 1–2 years of age**
  should spend at least 180 minutes in a variety of physical activities at any intensity, including moderate- to vigorous-intensity physical activity, spread throughout the day; more is better.
- **Children 3–4 years of age**
  should spend at least 180 minutes in a variety of physical activities at any intensity, of which at least 60 minutes is moderate- to vigorous-intensity physical activity, spread throughout the day; more is better.

Strong recommendations, very low quality evidence

Question

In children under 5 years of age what dose (i.e., durations, frequencies, patterns, types, and intensities) of physical activity, as measured by objective and subjective methods, is associated with favourable health indicators?

Summary of evidence

The 2017 systematic review of the relationship between physical activity and health indicators in the early years (0–4 years) *(26)* assessed 908 full text articles and identified 96 studies, from 36 countries with 71,291 unique participants, that met the inclusion criteria. One additional study *(31)* (301 participants) was incorporated up to March 2017 for the update to inform the Australian guidelines process and an additional six studies (2,327 participants) for the update to December 2017 *(32-37)*. These included randomized-controlled trials (RCTs) (n=8), cluster RCTs (n=5), non-randomized interventions (n=10), cross-over trials (n=3), longitudinal (n=12), longitudinal with additional cross-sectional analysis (n=5), case-controlled (n=4), case cross-over (n=1) and cross-sectional (n=55) studies. One meta-analysis was conducted (four studies, 1100 participants) examining adiposity as a health indicator. The GRADE table for physical activity is available in Web Annex Evidence Profiles, section 1.1 .

Physical activity was associated with improved motor and cognitive development, psychosocial and cardiometabolic health in randomized and non-randomized intervention studies and with improved motor development, fitness and bone and skeletal health in observational studies. Moderate- to vigorous-intensity, vigorous-intensity and total physical activity were beneficially associated with several health indicators and although it was not possible to determine the most favourable frequency or duration of physical activity, more physical activity appeared to be better.

In infants less than 1 year of age, 30 minutes per day of prone position was favourably associated with health indicators.

For the critical outcomes, there was moderate quality evidence for cognitive development, low quality evidence for psychosocial health, motor development and adiposity and very low-quality evidence for fitness. The overall quality of evidence was rated as very low using the GRADE framework.

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Rationale

The recommendation for 180 minutes per day of physical activity was first proposed by Australian guidelines in 2010 *(38)*, based on expert consensus and included in the United Kingdom *(39)* and Canadian guidelines of 2012 *(40)*. The current evidence available is from studies that assessed compliance with a 180 minutes per day duration of physical activity vs non-compliance and the former shows an association with better health outcomes. No evidence was found favouring less physical activity. For children who are currently inactive, progressive increase in activity to reach the target through additional time for free active play will have health benefits.

The recommendation for 60 minutes of moderate- to vigorous-intensity physical activity per day for 3–4-year-olds aligns with the recommendation for 60 minutes per day of moderate- to vigorous-intensity physical activity in children 5 years of age and older *(1)*, and is associated with desirable health indicators.

The GDG discussed extensively the use of the term physical activity or active or energetic play, recognizing that in young children, physical activity will most likely take the form of energetic play rather than organized exercise, physical education or sport. The GDG decided to use the term physical activity and moderate- to vigorous-physical activity as these are the terms used in guidelines for older children and can be quantified in terms of Metabolic Equivalent of Task (METs) that are used in the measurement of physical activity. In the implementation of the guidelines, the term energetic play may be preferred (see glossary for definitions).

The GDG made a strong recommendation as the desirable outcomes of promoting physical activity outweigh possible harms. For infants, benefits of at least 30 minutes of prone position (tummy time) while awake include improved motor development and reduced likelihood of deformational plagiocephaly. The benefit of at least 5 hours of unrestricted movement per day is reduced adiposity. Evidence for psychosocial health was equivocal. For children 1–4 years of age, the benefits of increased levels of physical activity include improved motor and cognitive development, and fitness. Most studies showed a favourable or inconclusive association with adiposity, and very few studies showed an unfavourable association. In addition, there is no evidence that physical activity is associated with serious risk of harms or injury in any age group.

While the GDG acknowledged that in some settings there may be additional resource requirements to ensure young children meet physical activity recommendations, the panel considered resource implications to be minimal due to the type and variety of physical activities that young children can engage in (such as free, energetic play) to meet physical activity recommendations at home or in child care settings. As such, the GDG concluded that the potential benefits of promoting physical activity outweigh the costs. No evidence was available on the values and preferences, acceptability or feasibility of the recommendations in low and middle-income settings. The GDG discussed that there may be some variability on how some groups value adiposity in children. Physical activity can be increased in various ways requiring minimal facilities or equipment, but safe environments should be ensured. The GDG noted that for infants, interactive floor-based play would require appropriate supervision and a safe environment. Tailored communication and/or resources may be required for certain settings (such as low resource settings) and special populations (children with disabilities). The GDG noted that studies in Canada *(33, 34)* and Australia *(35)* indicated that most children 1 to 4 years of age and about 30% of infants were already meeting the recommendations for physical activity and prone position (tummy time) respectively and considered this evidence to support the feasibility of the recommendation. The GDG concluded that the physical activity recommendations were feasible and that promoting more physical activity in the longer-term would probably increase health equity by improving health outcomes, although no evidence was available.

SEDENTARY TIME

RECOMMENDATIONS

- **Infants (less than 1 year)**
  should not be restrained for more than 1 hour at a time (e.g., in prams/strollers, high chairs, or strapped on a caregiver's back). Screen time is not recommended. When sedentary, engaging in reading and storytelling with a caregiver is encouraged.
- **Children 1–2 years of age**
  should not be restrained for more than 1 hour at a time (e.g., in prams/strollers, high chairs, or strapped on a caregiver's back) or sit for extended periods of time. For 1-year-olds, sedentary screen time (such as watching TV or videos, playing computer games) is not recommended. For those aged 2 years, sedentary screen time should be no more than 1 hour; less is better. When sedentary, engaging in reading and storytelling with a caregiver is encouraged.
- **Children 3–4 years of age**
  should not be restrained for more than 1 hour at a time (e.g., in prams/strollers) or sit for extended periods of time. Sedentary screen time should be no more than 1 hour; less is better. When sedentary, engaging in reading and storytelling with a caregiver is encouraged.

Strong recommendations, very low quality evidence

Question

In children under 5 years of age what dose [i.e., durations, patterns (frequency, interruptions), and type] of sedentary behaviour, as measured by objective and subjective methods, is associated with favourable health indicators?

Summary of evidence

The 2017 systematic review of the relationship between sedentary behaviour and health indicators in the early years (0–4 years) *(27)* assessed 334 full text articles and identified 96 studies, from 33 countries with 195,430 unique participants, that met the inclusion criteria. Three additional studies *(41-43)* (2,592 participants) were incorporated up to March 2017 for the update to inform the Australian guidelines process and an additional four studies *(32, 34, 37, 44)* (2,222 participants) for the update to December 2017. In total, these included RCTs (n=2), case-control (n=3), longitudinal (n=31), longitudinal with additional cross-sectional analysis (n=5), and cross-sectional (n=62) studies. The GRADE table for sedentary behaviour is available in Web Annex Evidence Profiles, section 1.2 ⬇.

There was no association between objectively measured sedentary time and adiposity or motor development. There was a predominantly unfavourable, or a null association between screen time and adiposity, cognitive or motor development and psychosocial health. There was a favourable or null association between time spent with a caregiver reading or storytelling and cognitive development. There was a predominantly unfavourable, or null association between time spent seated (in pram or stroller, for example) and adiposity or motor development.

For the critical outcomes, there was moderate to very low-quality evidence for screen time and adiposity, motor and cognitive development and psychosocial health and very low-quality evidence for overall sedentary time and adiposity, motor development and psychosocial health. The overall quality of evidence was rated as very low.

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Rationale

Previous Canadian guidelines on sedentary behaviour for this age group published in 2012 were derived from expert consensus (14). Current evidence available is from studies of sedentary screen-time and time spent restrained (when children are not able to move around freely and play for an extended period), that assessed compliance with this 2012 recommendation vs non-compliance. The former shows an association with better health outcomes. No evidence was found favouring prolonged restrained time.

The GDG recognized that sedentary time may include time spent engaged in quiet play without electronic media. These pursuits, such as puzzles, block building drawing, colouring, cutting out, singing, music etc. are important for child development and these activities have cognitive benefits. In developing the recommendation, the GDG discussed the importance of reflecting the value of sedentary interactive time with a caregiver in particular. An attempt to comment on all possible beneficial sedentary activities would risk leaving out an activity that is important in a particular setting.

The GDG made a strong recommendation as the desirable outcomes of reducing sedentary screen time and time spent restrained outweighed possible harms. The benefits of less screen-based sedentary behaviour (TV viewing, watching videos, playing computer games) include reduced adiposity, improved motor and cognitive development and psychosocial health. The benefits of less time spent restrained (car seats, prams/strollers, high chairs, or strapped on a caregiver's back) include reduced adiposity and improved motor development. The benefit of more time spent with a caregiver reading or storytelling (while sitting or lying) is improved cognitive development. There was no evidence of risks of harms associated with reducing screen-based sedentary time and time restrained. There is an absence of evidence on values and preferences, feasibility and acceptability of the recommendations. The GDG concluded that, although there may be some variability on how some groups value adiposity in children and that in some contexts there may be issues about reducing time spent restrained for infants, due to cultural norms and values and caregivers' multiple responsibilities, the potential benefits of reducing sedentary screen time and time spent restrained outweigh the possible harms or costs and may increase health equity by improving health outcomes.

SLEEP TIME

RECOMMENDATIONS

During a 24-hour period,

- **Infants (less than 1 year)**
  should have 14–17h (0–3 months of age) or 12–16h (4–11 months of age) of good quality sleep, including naps;
- **Children 1–2 years of age**
  should have 11–14h of good quality sleep, including naps, with regular sleep and wake-up times;
- **Children 3–4 years of age**
  should have 10–13h of good quality sleep, which may include a nap, with regular sleep and wake-up times.

Strong recommendations, very low quality evidence

Question

In children under 5 years of age what duration of sleep, as measured by objective and subjective methods, is associated with favourable health indicators?

Summary of evidence

The 2017 systematic review of the relationship between sleep duration and health indicators in the early years (0–4 years) (28) assessed 133 full text articles and identified 69 studies, from 23 countries with 148,524 unique participants, that met the inclusion criteria. Three additional studies *(45-47)* (1,300 participants) were incorporated up to March 2017 for the update to inform the Australian guidelines process and an additional five studies *(48-52)* (9,401 participants) for the update to December 2017. In total, these included randomized trials (n=5), non-randomized interventions (n=1), longitudinal (n=22), longitudinal with additional cross-sectional analysis (n=7), and cross-sectional (n=42) studies. The GRADE table for sleep duration is available in Web Annex Evidence Profiles, section 1.3 ⬇.

Shorter sleep duration was associated with higher adiposity, poorer emotional regulation, impaired growth, more screen time and higher risk of injuries. There were no clear associations between sleep duration and cognitive and motor development or physical activity.

For the critical outcomes, there was high quality evidence for cognitive development and emotional regulation (although these were very small RCTs restricting daytime naps), low quality evidence for adiposity and very low-quality evidence for motor development or growth. The overall quality of evidence was rated as very low.

Rationale

Previous sleep duration recommendations have been derived from expert consensus *(28, 53, 54)*. Current evidence available is from studies that assessed compliance with sleep duration recommendations vs. non-compliance and the former shows an association with better health outcomes. No evidence was found favouring shortened sleep duration or inadequate sleep. The GDG made a strong recommendation as the desirable outcomes of ensuring adequate sleep and preventing shorter sleep duration outweigh possible harms. Shorter sleep duration is unfavourably associated with adiposity, emotional regulation, growth, and some measures of cognitive development. Shorter sleep duration is associated with more TV viewing and time spent playing computer games and with an increased risk of injury. The GDG noted that there may be some resource implications to meet the recommendations for adequate sleep in homes and childcare settings with limited space and where behaviours and routines of the children and their parents are not conducive to sufficient sleep and regular sleep and wake times. Implementing these recommendations may require changes to the behaviours and routines of the children, their parents and caregivers, and physical environment in places where children sleep. However, in the view of the GDG the potential benefits of ensuring adequate sleep outweigh the costs and ensuring young children sleep an adequate number of hours per day would probably increase health equity by improving health outcomes.

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INTEGRATED RECOMMENDATIONS

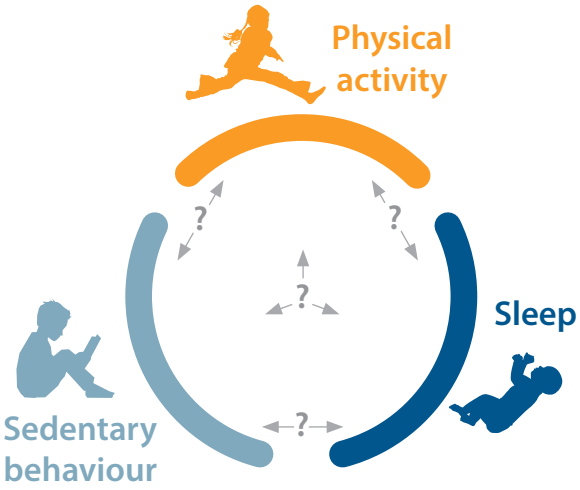
- **For the greatest health benefits, infants, and young children should meet all the recommendations for physical activity, sedentary behaviour and sleep in a 24-hour period.**
- **Replacing restrained or sedentary screen time with more moderate- to vigorous-intensity physical activity, while preserving sufficient sleep, can provide additional health benefits.**

Strong recommendation, very low quality evidence

Question

In children under 5 years of age, **what are the relationships** between each of the following combinations of movement behaviours and health indicators?

- Sleep & sedentary behaviour
- Sleep & physical activity
- Sedentary behaviour & physical activity
- Sleep & sedentary behaviour & physical activity



Summary of evidence

The 2017 systematic review of the relationship between combinations of movement behaviours and health indicators in the early years (0–4 years) (29) assessed 277 full text articles and identified 10 studies, from five countries with 7,436 unique participants, that met the inclusion criteria. No additional studies were incorporated up to March 2017 for the update to inform the Australian guidelines process and an additional three studies *(32, 55, 56)* (568 participants) for the update to December 2017. In total, these included cluster RCTs (n=5), non-randomized interventions (n=1), longitudinal (n=3) and cross-sectional (n=4) studies. The GRADE table for combined movement behaviours is available in Web Annex Evidence Profiles, section 1.4.

The most ideal combinations of sedentary behaviour and physical activity, thought to be beneficial for health (less sedentary time, more physical activity) were favourably associated with motor development and fitness in pre-school children, both favourably and not associated with adiposity and not associated with growth. The most ideal combinations of sleep and sedentary behaviour (more sleep and less sedentary time) were favourably associated with adiposity in young children.

The evidence showed that replacing sedentary time with moderate- to vigorous-intensity physical activity is likely to improve health indicators in children. However, there was no information available that considered all three movement behaviours (physical activity, sedentary and sleep time).

For the critical outcomes, there was moderate quality evidence for growth, low quality evidence for motor development and adiposity and very low-quality evidence for fitness. The overall quality of evidence was rated as very low.

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Rationale

The GDG considered the value of a 24-hour approach to recommendations on physical activity, sedentary behaviour and sleep. Although the GDG discussed each aspect of the recommendations individually, they expressed a preference for the three areas to be presented together for each age group with clear reference to the contribution each makes to the 24-hours of a child's day. The GDG emphasized that the recommendations do not attempt to account for each hour of the child's day and that these will necessarily include quiet play and sitting time (during meals, for example).

The GDG made a strong recommendation, as favourable outcomes outweigh possible harms of combinations of more physical activity, less sedentary screen time and longer sleep duration, and that the greatest benefits result from meeting all three behaviours. In children 1–4 years of age the benefits of the less sedentary screen time and more physical activity are favourably associated with motor development and fitness, with no significant association with growth. Combinations of longer sleep duration and less sedentary screen time, and longer sleep duration and more physical activity were favourably associated with cognitive development and adiposity. Meeting all three recommendations of the Australian 24-hour movement guidelines for the early years was associated with favourable adiposity *(57)*. Compositional analysis from Canada using objective monitoring indicates that lower levels of sedentary behaviour and higher levels of moderate- to vigorous-intensity physical activity while preserving sleep are associated with favourable health outcomes *(58)*. The benefits of replacing sedentary time with moderate- to vigorous-intensity physical activity are increased fitness in children 3–4 years of age. There was no evidence of risks of harms associated with meeting any of the combinations of more physical activity, less sedentary screen time and longer sleep duration.

In the view of the GDG, although in some settings there may be additional resource requirements to ensure young children meet all recommendations, the potential benefits of meeting all the recommendations outweigh the costs. The GDG determined that the integration of the movement behaviours may enhance the feasibility of implementation of individual movement and sleep recommendations by providing parents and caregivers with opportunities to gradually replace undesirable behaviours with more desirable behaviours and recognizing the importance of quality interactions with caregivers and preserving sufficient sleep.

RESEARCH GAPS

There is a continuing need for high-quality studies, in particular that:

1. examine the entire 24-hour day and physical activity, sedentary behaviour and sleep duration in young children;
2. establish standardized procedures and objective measurement to enable comparison between studies;
3. study a broader range of health indicators, including additional indicators of motor, cognitive and psychosocial development and the long-term effects of early interventions;
4. provide a cost-effectiveness analysis of interventions to improve physical activity, sedentary behaviours and sleep duration in young children;
5. examine the impact of screen-based activities compared with interactive sedentary activities such as storytelling on health indicators;
6. explore the developmentally appropriate dose and intensity of physical activity in young children;
7. examine the relationship between sleep duration and motor development, growth and harms or injuries;
8. consider confounders such as diet;
9. consider the particular needs of children with disabilities and how guidelines can be adapted to meet their needs
10. examine the key factors that enable dissemination, adaptation, activation, implementation and uptake of the guidelines.

DISSEMINATION, IMPLEMENTATION AND EVALUATION

The goal of these guidelines is to provide policy-makers and those who develop family, child-care and community intervention programmes or provide early childhood education services with recommendations on how much time infants and young children should spend each day being physically active and sleeping, and provide recommendations on maximum time these children should spend on sedentary screen activities or restrained. Parents and caregivers seek advice on childcare from a number of different professionals and dissemination of the guidelines to all those who have contact with parents and caregivers will be essential. Derivative products that support uptake of the guidelines in a manner that is accessible, understandable, encourages behaviour changes without making parents or caregivers feel guilty and does not imply that additional equipment or facilities are necessary, will be vitally important.

Dissemination and local adaptation

The guidelines will be published and available online and as print copies in all six official languages. The release of the guidelines will be widely publicized through regional and country offices, the WHO global and regional websites and by reaching out directly to relevant UN agencies and partners. These guidelines will be launched at a suitable international event to increase awareness of the recommendations. It will be disseminated through health and early childhood educator networks.

WHO can support local adaptation of the guidelines through WHO country offices, with support from regional and headquarters offices.

A summary advocacy brochure will be prepared to help disseminate information and raise awareness of the importance of movement behaviours in young children and the existence of global guidance. In addition, a practical guide, with links to resources, such as standards for physical activity in early child education and care settings, and case studies will be developed and made available as an online toolkit, such that it can be kept up-to-date. The aim of this will be to support Member States and NGOs in developing interventions and approaches to promote healthy physical activity, sedentary and sleep time behaviours in young children.

MANAGEMENT OF GUIDELINE DEVELOPMENT PROCESS

CONTRIBUTORS TO GUIDELINE DEVELOPMENT

WHO Steering Group

The Steering Group (SG) included experts in the areas of physical activity, childhood obesity, early childhood development, early childhood nutrition and environment, from both headquarters and regional offices.

- Dr Fiona Bull (Prevention of noncommunicable diseases) – Chairperson
- Dr Temo Waqanivalu (Prevention of noncommunicable diseases)
- Dr Juana Willumsen (Prevention of noncommunicable diseases)
- Dr Larry Grummer-Straw (Nutrition for health and development)
- Dr Bernadette Daelmans and Dr Nigel Rollins (Maternal, newborn, child and adolescent health)
- Dr João Breda (European Regional Office)
- Dr Thaksaphon Thamarangsi (South East Asia Regional Office)

The Steering Group drafted the scope of the guidelines, the PICOs, reviewed the declaration of interests, drafted, reviewed and finalized the guidelines.

Guideline Development Group (GDG)

The Guideline Development Group consisted of a broad group of relevant experts in the field and end users of, and persons affected by, the recommendations. The members of the Guideline Development Group (GDG) included **Mohammed Ansari** (GRADE methodologist, Canada), **Christine Chen** (co-chair – Early childhood development specialist, Singapore), **Louise Choquette** (Early childhood health promotion specialist, Canada), **Nyaradzai Dangarembizi-Munambah** (Occupational Therapist, Zimbabwe), **Catherine Draper** (Academic- physical activity and cognitive development, South Africa), **Nathalie Farpour-Lambert** (Clinical specialist childhood obesity and sports medicine, Switzerland), **Kamesh Flynn** (Early childhood development specialist, South Africa), **Noshin Khan** (Early childhood development specialist, Pakistan), **Alyssa Khouaja** (Ministry Women, Family and Childhood, Tunisia), **Albert Li** (Academic – sleep, China, Hong Kong SAR), **Anthony Okely** (Academic – physical activity, Australia), **Matias Portela** (Ministry of Health (Health promotion and community participation), Chile), **John Reilly** (Academic – physical activity and childhood obesity, United Kingdom), **Rachel Rodin** (co-chair, Diet and physical activity policy development, Canada), **Mark Tremblay** (Academic- physical activity, Canada), **Pujitha Wickramasinghe** (Paediatric Association, Sri Lanka). Further details of the GDG are available in the Annex.

A first GDG meeting was held 27-28 November 2017 at which the GDG decided on the PICO questions, reviewed the existing systematic reviews and identified updates required. The group agreed on the process for decision-making on recommendations and the strength of the evidence to be applied at the second GDG meeting. The second meeting was held 18-20 April 2018 at which the updated evidence was reviewed and final recommendations agreed upon by the GDG by consensus.

External Review Group (ERG)

Five peer reviewers were drawn from a list of individuals suggested by the GDG and Steering Group. They provided relevant expertise, including programme implementation and represented five WHO regions. The ERG reviewed the draft guidelines and provided feedback to the Steering Group on issues of clarity and implementation, which was incorporated, as appropriate. External peer reviewers did not make changes to the recommendations.

Declarations of Interest

All GDG members completed and submitted a WHO Declaration of Interests form. The Steering Group reviewed and assessed the curriculum vitae and declarations of interest submitted by each member and performed an internet and publications search to identify any obvious public controversies or interests that may lead to compromising situations for WHO and the expert concerned. The names and brief biographies of all proposed GDG members were published on the WHO Diet and Physical Activity and Commission on Ending Childhood Obesity webpages for public consultation for a period of 14 days. No comments were received. Declared interests are summarized and reviewed. No conflict of interest was identified.

EVIDENCE TO RECOMMENDATIONS

In accordance with the GRADE process, the GDG considered the proposed wording of the recommendations and the rating of its strength (strong or conditional) considering not just the nature and quality of evidence but an assessment of caregiver and children's values and preferences, the balance between benefits and harms and the impact of the recommendation on gender, social and health equity, as well as the acceptability, feasibility and resource implications. Decisions were reached by consensus through discussion. Voting was not required for the GDG to agree on the wording or strength of the recommendations.

Assessment of the quality of evidence

Using the GRADE framework, the GDG examined the quality of primary research contributing to each outcome identified in the PICOs and assessed the overall quality of evidence taking into consideration the risk bias, inconsistency, imprecision, indirectness of the evidence and publication bias across each outcome. GRADE tables detailing this information for each PICO are available in Web Annex Evidence Profiles.

Values and Preferences

The GDG also considered values and preferences of those affected by the guidelines (in this case parents and caregivers). Stakeholder surveys and focus group discussions undertaken in the development of the integrated 24-hour movement guidelines for the early years in Canada and Australia *(21, 22)* indicated there was low variability in parents' and stakeholders' preference for similar recommendations. Informants of the focus group discussions included those from vulnerable communities *(21, 22)*. No other evidence was available on values and preferences of stakeholders on physical activity, sedentary and sleep behaviours in this age group. In addition, the GDG discussed the variability in values and preferences from the perspective of their experience, recognizing that the GDG, although living and working in a range of settings, could not represent all the possible life-experiences of children and caregivers.. The Consensus Panel that is developing guidelines on movement behaviours for the 0–5-year age group in South Africa recently met and discussed early results from an assessment of children's physical activity, sedentary and sleep patterns. These data form part of a PhD and are in the process of being prepared for publication, but were shared with the GDG during the second GDG meeting. All these sources of information were used to guide the GDG's discussion on values and preferences, in addition to expert knowledge from the GDG on the situation in their settings.

Resource implications

A systematic review of the resource implications for these guidelines was prepared by Olga Milliken, of the WHO Collaborating Centre on Chronic NCD Policy, Ottawa, Canada. This review considered the evidence for physical activity interventions, and concluded that there is very limited evidence on cost-effectiveness of relevant interventions for children, and no evidence for children under 5 years of age and their parents. In conclusion, the search yielded no eligible published articles. The studies identified were excluded based on two criteria: 1) the interventions comprised non-movement related exposures, including diet, and 2) the study population was largely composed of older children (over 5 years) in the school setting. The GDG were also informed by the results Canadian and Australian stakeholder surveys on the integrated 24-hour movement guidelines for the early years; 81% of respondents believed the benefits outweigh costs and 60% felt the cost to use or implement the guidelines would be minimal *(21, 22)*.

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The expert opinion of the GDG informed discussion on the resource implications of the recommendations in different settings.

The cost to government and non-government organizations of guideline implementation may be minimal, if recommended physical activity can be relatively easily incorporated by individuals (parents and their children) into their lives, or existing resources in primary care, day-care/school-based settings can be shifted resulting in increased physical activity. No evidence was available on the cost to parents or caregivers of implementing the recommendations.

Equity, acceptability and feasibility

The GDG discussed at length for each recommendation if implementing the recommendations would decrease health equity in their experience. They also considered Canadian and Australian stakeholder surveys that actively sought inputs from vulnerable groups and all socio-economic groups that concluded that adhering to the integrated 24-hour movement guidelines for the early years is likely to benefit all groups equally and recommendations could be achieved equitably *(21, 22)*.

In addition, in the absence of data from low- and middle-income countries, data from studies of young children's current physical activity, sedentary and sleep behaviours compared to the recommendations in Canada *(59, 60)* and Australia *(61)* informed GDG discussion on the feasibility of the achieving recommended durations of physical activity and sleep.

PEER REVIEW

The draft guidelines were reviewed by external peer reviewers identified by the GDG and Steering Group. External peer reviewers were requested to provide comments on issues of clarity, presentation of the evidence and implementation and comments were incorporated as appropriate. External peer reviewers could not change the recommendations that had been decided upon by the GDG. External peer reviewers are listed in the Annex and declarations of interest were review and no conflict identified. In addition, inputs were actively sought from WHO regional offices.

EVALUATION

To evaluate use of the guidelines in country, an online survey will be conducted 2 and 4 years after publication. The first survey will assess the policy discussion on these guidelines and the need for national adaptation. The second survey will focus on the adoption of the recommendations into national guidelines to caregivers of young children and childcare providers and whether these have been implementation into childcare settings. The survey will be administered through WHO regional and country offices and selected respondents of other user groups (e.g. professional associations, NGOs).

UPDATING

These guidelines will be updated after ten years, unless further research in the area provides additional evidence to warrant an earlier update.

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