



## Commentary

## 2020 WHO guidelines on physical activity and sedentary behavior



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## ABSTRACT

The World Health Organization released new guidelines on physical activity and sedentary behaviour in November 2020. This commentary summarises these guidelines, including the new elements. An evaluation of the guidelines for each specific sub-population is provided. Finally, as the author group includes physical activity researchers from four continents, we provide recommendations on how to support the implementation of the new guidelines.

In 2020 the World Health Organization (WHO) released new guidelines on physical activity and sedentary behaviour for children and adolescents, adults, and older adults.<sup>1</sup> Guidelines are an important tool for policymakers to promote healthy levels of these behaviours. For the public, they provide evidence-based guidance on how much time should be spent in these behaviours, how often, and at what intensity to promote health. Although many countries have their own guidelines on these behaviours, guidelines from the WHO are important to draw attention globally to the importance of these behaviours and to provide guidance for those countries that do not have the resources to develop their own guidelines.

The Guidelines are designed for any stakeholder with an interest in understanding and advocating for the importance of healthy levels of physical activity and sedentary behaviour. The 2020 guidelines replace the 2010 WHO Global recommendations on physical activity for health.<sup>2</sup> For the first time, the 2020 guidelines contain specific recommendations for pregnant and postpartum women, adults and older adults with chronic conditions, children and adolescents living with disability, and adults living with disabilities. A summary of the main recommendations for each sub-population appears in Table 1. The WHO Guidelines are the most recent addition to a triumvirate of resources from the WHO that includes the Global Action Plan for Physical Activity (GAPPA)<sup>3</sup> and ACTIVE technical package.<sup>4</sup>

A welcome addition in the Guidelines is a recommendation for sedentary behaviours for each subpopulation (see Table 1). This addition was based on extensive reviews of the growing body of research examining associations between sedentary behaviours and health outcomes. Essentially, the 2020 guidelines recommend individuals across ages, with or without specific health conditions, should limit the amount of time spent being sedentary. In particular, recreational screen time was highlighted as a potential source of sedentary behaviour that should be avoided in children with or without disabilities. Adults, by contrast, are recommended to replace sedentary time with activities of other intensities. Further, adults are suggested to do more moderate-to-vigorous forms of physical activity to reduce the negative effects of sedentary behaviours, if these were unavoidable.

Given there is increasing evidence to support the potentially

detrimental effects of long durations of sedentary behaviours on health outcomes, the inclusion of recommendations regarding these behaviours should be welcomed by many health practitioners and researchers. The change may encourage more government bodies to incorporate sedentary behaviour recommendations into national guidelines. Additional research in this area may also be galvanised. Nonetheless, individuals who are less knowledgeable in this research area may wish to have more discrete recommendations on total sedentary durations, or on the number or the lengths of sedentary bouts. The presence of such guidelines may seem attractive, yet the Guideline Development Group adjudged that there was insufficient research evidence to provide guidelines at this level of specificity. On practical levels, one can envision that these types of behaviours are related to a multitude of factors such as age, schooling, type of work undertaken, and other barriers that may appear to be uncontrollable to individuals. Given the diverse nature of sedentary behaviours, a “one-size-fits-all” approach may be inappropriate. However, we can expect more research evidence to be available before the release of the next edition of the WHO guidelines.

Having specific recommendations for pregnant and postpartum women is important as it states the need for physical activity and helps to overcome long-standing perceptions about the potential detrimental impact of maternal physical activity on the foetus and on the delivery process. From the position of evidence-based medicine, it has been demonstrated that physical activity during the pregnant and postpartum periods is associated with positive health-related outcomes such as reduced gestational weight gain and reduced risk of gestational diabetes. Physical activity does not increase the risk of gestational hypertension and preeclampsia and is not associated with an increased incidence of miscarriage, stillbirth or delivery complications or any adverse effects on birth weight or preterm birth. Having a strong and clear recommendation on physical activity for pregnant and postpartum women without contraindications, and with clear safety considerations, is important. These safety considerations are another strength of the Guidelines as they are appropriately detailed and formulated and provide clear guidance for actions and decision-making.

Adults and older adults with chronic conditions represent a substantial segment of society. Specific guidelines for these sub-populations

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**Table 1**  
Summary of key recommendations for each age group and sub-population.

Age group/sub-population	Recommendation		
	Physical activity	Muscle-strengthening	Sedentary behaviour
Children and adolescents (5-17y)	<ul style="list-style-type: none"> <li>At least an average of 60 min/day of MVPA, mostly aerobic.</li> </ul>	<ul style="list-style-type: none"> <li>VPA as well as activities that strengthen muscle and bone should be incorporated at least 3 days/week.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the amount of time spent being sedentary, particularly recreational screen time.</li> </ul>
Adults (18-64y)	<ul style="list-style-type: none"> <li>At least 150–300 min of MPA or at least 75–150 min of VPA or an equivalent combination throughout the week.</li> <li>For additional health benefits, increase time spent in MPA to more than 300 min or time spent in VPA to more than 150 min per week.</li> </ul>	<ul style="list-style-type: none"> <li>On at least 2 days/week participate in muscle strengthening activities at moderate or greater intensity that involve all major muscle groups.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the amount of time spent being sedentary.</li> <li>Replace sedentary behaviour with more physical activity of any intensity.</li> </ul>
Older adults (≥65 y)	<ul style="list-style-type: none"> <li>At least 150–300 min of MPA or at least 75–150 min of VPA or an equivalent combination throughout the week.</li> <li>For additional health benefits, increase time spent in MPA to more than 300 min or time spent in VPA to more than 150 min per week.</li> </ul>	<ul style="list-style-type: none"> <li>On at least 2 days/week participate in muscle strengthening activities at moderate or greater intensity that involve all major muscle groups.</li> <li>On at least 3 days/week varied multicomponent physical activity that emphasises functional balance and strength of at least a moderate intensity.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the amount of time spent being sedentary.</li> <li>Replace sedentary behaviour with more physical activity of any intensity.</li> </ul>
Pregnant and postpartum women	<ul style="list-style-type: none"> <li>At least 150 min of MPA a week.</li> <li>Women who, before pregnancy, habitually engaged in VPA or who were physically active, can continue these activities during pregnancy and the postpartum period.</li> </ul>	<ul style="list-style-type: none"> <li>Incorporate a variety of aerobic and muscle-strengthening activities. Adding gentle stretching may also be beneficial.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the amount of time spent being sedentary.</li> <li>Replace sedentary behaviour with more physical activity of any intensity</li> </ul>
Adults and older adults with chronic conditions	<ul style="list-style-type: none"> <li>At least 150–300 min of MPA or at least 75–150 min of VPA or an equivalent combination throughout the week.</li> <li>For additional health benefits, increase time spent in MPA to more than 300 min or time spent in VPA to more than 150 min per week.</li> </ul>	<ul style="list-style-type: none"> <li>On at least 2 days/week participate in muscle strengthening activities at moderate or greater intensity that involve all major muscle groups.</li> <li>On at least 3 days/week varied multicomponent physical activity that emphasises functional balance and strength of at least a moderate intensity.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the amount of time spent being sedentary.</li> <li>Replace sedentary behaviour with more physical activity of any intensity</li> </ul>
Children and adolescents living with disability	<ul style="list-style-type: none"> <li>At least an average of 60 min/day of MVPA, mostly aerobic.</li> </ul>	<ul style="list-style-type: none"> <li>VPA as well as activities that strengthen muscle and bone should be incorporated at least 3 days/week.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the amount of time spent being sedentary, particularly recreational screen time.</li> </ul>
Adults living with disability	<ul style="list-style-type: none"> <li>At least 150–300 min of MPA or at least 75–150 min of VPA or an equivalent combination throughout the week.</li> <li>For additional health benefits, increase time spent in MPA to more than 300 min or time spent in VPA to more than 150 min per week.</li> </ul>	<ul style="list-style-type: none"> <li>On at least 2 days/week participate in muscle strengthening activities at moderate or greater intensity that involve all major muscle groups.</li> <li>On at least 3 days/week varied multicomponent physical activity that emphasises functional balance and strength of at least a moderate intensity.</li> </ul>	<ul style="list-style-type: none"> <li>Limit the amount of time spent being sedentary.</li> <li>Replace sedentary behaviour with more physical activity of any intensity</li> </ul>

MPA = moderate-intensity physical activity; VPA = vigorous-intensity physical activity; MVPA = moderate-to vigorous-intensity physical activity.

is important for promoting physical activity and demonstrating its evidence-based impact on health-related outcomes. The recommendations for adults and older adults with chronic conditions focuses on four groups: cancer survivors, people living with hypertension, people living with type-2 diabetes and people living with HIV. This is a significant number of people. More than 4 billion live with elevated systolic blood pressure<sup>5</sup> and it is a leading risk factor for death and disability adjusted life years (DALY). The annual incidence rate for cancer is 24.5 million<sup>6</sup> with a substantial number of these cases surviving each year. Thirty-eight million people live with HIV.<sup>7</sup> A review of available evidence demonstrates clear positive impacts from physical activity for these groups: for cancer survivors, it is a decreased risk of all-cause, cause-specific and cancer-specific mortality; in HIV patients physical activity was associated with a slowing of progression of the virus and improved cardiorespiratory fitness.

Including specific recommendations for these sub-populations is important and sends a clear message that chronic conditions are not a barrier to participating in physical activity; moreover, for people living with the four listed conditions, the same levels of physical activity as healthy adults are recommended, with some precautions. It is important to note that a medical clearance is generally unnecessary for individuals without contraindications. This simplifies the decision to start participating in and maintaining physical activity. However, it is advised that individuals consult a relevant healthcare professional if seeking advice on the types and amounts of physical activity appropriate for them.

Although the above chronic conditions were specifically highlighted based on the strength of evidence of their association with physical activity, other non-communicable diseases such as coronary heart disease and chronic respiratory diseases should be included. This is important given the number of patients globally with cardiovascular diseases, not

including hypertension, is 523 million.<sup>5</sup> Ischemic heart disease and chronic obstructive pulmonary disease (COPD) are leading causes of disease burden worldwide.<sup>8</sup> Further, the number of patients with chronic respiratory diseases is estimated to be 545 million.<sup>9</sup>

Chronic conditions can include infection and post-infection states other than the human immunodeficiency virus (HIV). The significant number of people globally who have been infected with COVID-19 may likely lead to an increase in the global prevalence of chronic conditions. Previous pandemics of coronavirus infections have shown that two years after the infection, impairment on physical capacity persisted and that 40% of individuals had symptoms of chronic fatigue. Moreover, 40% had psychiatric comorbidities 3.5 years after the initial diagnosis.<sup>10,11</sup> A three-month follow up of COVID-19 patients showed that 78% of the sample showed poor performances in at least one cognitive domain, with executive functions and psychomotor coordination being impaired in 50% and 57% of the sample, respectively.<sup>12</sup>

It would be useful to have clearer specifications for those with chronic conditions who do not have contraindications to physical activity. Without this, the message that *pre-exercise medical clearance is generally unnecessary for people without contraindications prior to beginning activity that is no more intense than a brisk walk* may be confounded. This would be the case where there is uncertainty in the category of those who have no contraindications. For example, the group of chronic conditions listed is quite diverse (hypertension and HIV for example will have quite different contraindications).

Over one billion people live with disability and have not been regularly included in recommendations for healthy lifestyles.<sup>13</sup> These people have a right to equal participation in all activities in society.<sup>14</sup> It is pleasing that the new WHO Physical Activity and Sedentary Behaviour Guidelines has a specific recommendation for people living with

disabilities. This is vital to ensuring disability inclusion that benefits all people living with disabilities. It would be helpful to include information on how to remove barriers that hinder people living with disability from physical activity participation. This would be particularly helpful using an individualised approach to account for different levels of disability and barriers. For example, those living with spinal cord injuries may not engage equally as those affected with poliovirus even both groups ambulate using a wheelchair. Those affected by poliovirus may have strong back support which encourages them to sit upright and move more using a wheelchair. However, those living with spinal cord injuries may not have the back strength to move as much as those affected by poliovirus. As such, although both groups have a similar type of disability, their needs and the potential barriers to achieving the required amount of physical activity may be different. Disability-friendly support should be in place to ensure a meaningful and equitable engagement of people living with disability in physical activity throughout society.

We wonder if the wording of “at least an average of 60 min per day ... across the week” may be difficult for some people to understand. We can see that the guidelines are trying to reinforce the message of averaging 60 min per day across the week rather than 60 min per day every day of the week (which is often how physical activity is operationalised when monitoring compliance with the guidelines). We think this may be challenging to message, especially in low- and middle-income countries. We also suggest that it would be useful to have included the word “accumulate” in the physical activity guidelines to make it clear that the activity does not need to be undertaken in one continuous bout. It is pleasing that there is a recommendation to limit the amount of recreational sedentary screen time. Unfortunately, without a time limit for this recommendation, it is impossible for any monitoring of this recommendation to occur. We strongly believe that a guideline for sedentary recreational screen time for children and adolescents is greatly needed at a global level, especially in low- and middle-income countries where their use is becoming more ubiquitous.<sup>15,16</sup> Without any guidance as to how much is recommended, we will see very high levels going unchecked. We are pleased that there is some mention of light-intensity physical activity in the recommendation to replace sedentary behaviour with more activity of any intensity. Finally, We would have liked to see a 24-h approach (integrated guidelines for physical activity, sedentary behaviour and sleep), similar to what was used for the WHO Guidelines for children under the age of 5 years<sup>17</sup> and has been used for child and adolescent guidelines in Canada<sup>18</sup> and Australia<sup>19</sup> and adult and older adult guidelines in Canada.<sup>20</sup>

### Box 1

#### Recommendations to support the implementation of the guidelines

- Utilise existing professional societies and networks to promote the guidelines and to advocate for support for the GAPP recommendations.
- Ministries of Health should ensure awareness of the role of the Guidelines in supporting recommended policy actions and interventions. Use national and international events to do this.
- Ensure the guidelines can be operationalised in ways that are relevant for communities in each specific region. Contextualise resources for settings in terms of language, types of activities recommended and taking into account cultural nuances.
- Revise existing guidelines for countries which have national guidelines on physical activity to align with the new global guidelines. For countries that do not have any guidelines, consider adopting the new guidelines.
- Some form of intervention or education should be built into the education system, especially for the children and adolescent guidelines in countries that have an “academic-first” mindset.

GAPPA = Global Action Plan for Physical Activity.

There are a number of recommendations for supporting the implementation of the guidelines. These are captured in **Box 1**. In addition, we would like to propose one more. That is, for more evidence for all sub-populations and guidelines from low- and middle-income countries. Without such evidence, our guidelines are largely based on evidence from a very small number of English-speaking high-income countries. This is not representative of the global population who undertake their physical activity and sedentary behaviour differently, which may vary associations with health, and which may result in different factors that need to be targeted to promote healthier levels of physical activity and sedentary behaviour.

### Submission statement

We confirm that this work is original and has not been published elsewhere, nor is currently under consideration for publication elsewhere.

### Authors' contributions

ADO drafted the outline and each co-author completed specific sections. All authors contributed equally to the **Box 1** recommendations.

### Conflict of interest

ADO was a member of the Guideline Development Group for the WHO Guidelines for physical activity, sedentary behaviour and sleep for children less than five years. ADO was also a member of the Guideline Development Group for the Australian and for the Canadian 24-h movement guidelines for children and young people.

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### References

1. World Health Organization. *WHO Guidelines on Physical Activity and Sedentary Behaviour*. Geneva: World Health Organization; 2020. License: CC BY-NC-SA 3.0 IGO <https://apps.who.int/iris/handle/10665/336656>.
2. World Health Organization. *Global Recommendations on Physical Activity for Health*. Geneva: World Health Organization; 2010. <https://apps.who.int/iris/handle/10665/44399>.
3. World Health Organization. *Global Action Plan on Physical Activity 2018-2030: More Active People for a Healthier World: At-A-Glance*. Geneva: World Health Organization; 2018. License: CC BY-NC-SA 3.0 IGO <https://apps.who.int/iris/handle/10665/272721>.
4. World Health Organization. *ACTIVE: A Technical Package for Increasing Physical Activity*. Geneva: World Health Organization; 2018. License: CC BY-NC-SA 3.0 IGO <https://apps.who.int/iris/handle/10665/275415>.
5. Roth GA, Mensah GA, Johnson CO, et al. Global burden of cardiovascular diseases and risk factors, 1990-2019: update from the GBD 2019 study. *J Am Coll Cardiol*. 2020;76(25):2982–3021. <https://doi.org/10.1016/j.jacc.2020.11.010>.
6. Fitzmaurice C, Abate D, Abbasi N, et al. Global, regional, and national cancer incidence, mortality, years of life lost, years lived with disability, and disability-adjusted life-years for 29 cancer groups, 1990 to 2017: a systematic analysis for the global burden of disease study. *JAMA Oncol*. 2019;5(12):1749–1768. <https://doi.org/10.1001/jamaoncol.2019.2996>.
7. World Health Organization. *Global Health Sector Strategy on HIV 2016-2021. Towards Ending AIDS*. Geneva: World Health Organization; 2016. <https://apps.who.int/iris/handle/10665/246178>.
8. Vos T, Lim SS, Abbafati C, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;396(10258):1204–1222. [https://doi.org/10.1016/S0140-6736\(20\)30925-9](https://doi.org/10.1016/S0140-6736(20)30925-9).
9. Soriano JB, Kendrick PJ, Paulson KR, et al. Prevalence and attributable health burden of chronic respiratory diseases, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet Respir Med*. 2020;8(6):585–596. [https://doi.org/10.1016/S2213-2600\(20\)30105-3](https://doi.org/10.1016/S2213-2600(20)30105-3).
10. Lam MH-B, Wing Y-K, Yu MW-M, et al. Mental morbidities and chronic fatigue in severe acute respiratory syndrome survivors: long-term follow-up. *Arch Intern Med*. 2009;169(22):2142–2147. <https://doi.org/10.1001/archinternmed.2009.384>.

11. Ngai JC, Ko FW, Ng SS, To K-W, Tong M, Hui DS. The long-term impact of severe acute respiratory syndrome on pulmonary function, exercise capacity and health status. *Respirology*. 2010;15(3):543–550. <https://doi.org/10.1111/j.1440-1843.2010.01720.x>.
12. Mazza MG, Palladini M, De Lorenzo R, et al. Persistent psychopathology and neurocognitive impairment in COVID-19 survivors: effect of inflammatory biomarkers at three-month follow-up. *Brain Behav Immun*. 2021;94:138–147. <https://doi.org/10.1016/j.bbi.2021.02.021>.
13. World Health Organization, World Bank. *World Report on Disability 2011*. Geneva: World Health Organization; 2011. <https://apps.who.int/iris/handle/10665/44575>.
14. United Nations. Convention on the rights of persons with disabilities. New York, United Nations. *Eur J Health Law*. 2007;14(3):281–298. <https://doi.org/10.1515/9783110208856.203>.
15. Cai Y, Zhu X, Wu X. Overweight, obesity, and screen-time viewing among Chinese school-aged children: national prevalence estimates from the 2016 Physical Activity and Fitness in China-The Youth Study. *J Sport Health Sci*. 2017;6(4):404–409. <https://doi.org/10.1016/j.jshs.2017.09.002>.
16. The Organisation for Economic Co-operation and Development. *PISA 2015 Results (Volume III): Students' Well-Being*. Paris: OECD Publishing; 2017. <https://doi.org/10.1787/9789264273856-en>.
17. World Health Organization. *Guidelines on Physical Activity, Sedentary Behaviour and Sleep for Children under 5 Years of Age*. Geneva: World Health Organization; 2019. License: CC BY-NC-SA 3.0 IGO <https://apps.who.int/iris/handle/10665/311664>.
18. Tremblay MS, Carson V, Chaput J-P, et al. Canadian 24-hour movement guidelines for children and youth: an integration of physical activity, sedentary behaviour, and sleep. *Appl Physiol Nutr Metabol*. 2016;41(6 Suppl 3):S311–S327. <https://doi.org/10.1139/apnm-2016-0151>.
19. Okely AD, Ghersi D, Hesketh KD, et al. A collaborative approach to adopting/adapting guidelines - the Australian 24-Hour Movement Guidelines for the early years (Birth to 5 years): an integration of physical activity, sedentary behavior, and sleep. *BMC Publ Health*. 2017;17(Suppl 5):869. <https://doi.org/10.1186/s12889-017-4867-6>.
20. Ross R, Chaput J-P, Giangregorio LM, et al. Canadian 24-Hour Movement Guidelines for Adults aged 18-64 years and Adults aged 65 years or older: an integration of physical activity, sedentary behaviour, and sleep. *Appl Physiol Nutr Metabol*. 2020; 45(10):S57–S102. <https://doi.org/10.1139/apnm-2020-0467>. Suppl. 2.

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