



Physical activity recommendations for health in the context of climate change: are we paying enough attention?

As recomendações de atividade física para a saúde no contexto das emergências climáticas: estamos suficientemente atentos?

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This paper is a call to reflection and action on physical activity (PA) recommendations for health in the current climate change context. From the World Health Organization PA recommendations, we highlight some of its most important messages: 1 – adults and older people should accumulate ≥ 150 min/week of moderate to vigorous PA; 2 – children and adolescents should accumulate ≥ 60 min/day of moderate to vigorous PA, incorporating at least 3 days of vigorous activities; 3 – we should reduce time spent in sedentary behavior; 4 – in cases of incapacities and/or personal or social restrictions, some PA is better than none. Despite the importance of this document and those messages, their scientific robustness and contemporaneity, they do not contextualize the practice of PA in light of the climate change scenario. Brazil had its PA promotion guide published in 2021, a result of the efforts of researchers from all over the country¹. Even though Brazil is one of the world leaders in studies about PA and health, with success cases of PA promotion, we still don't see, with the needed emphasis, a reflection about the recommendations in light of the new climatic scenario. This alert was brought up by Prof. Dr. Lamartine Pereira da Costa in meetings of the “Manifesto to Promote Physical Activity Post-COVID-19:” group (<https://celafiscs.org.br/manifesto-da-atividade-fisica-pos-covid-19/>), which brings together researchers dedicated to thinking about PA promotion after COVID-19, since 2020, under the leadership of the Study Center of the Physical Fitness Laboratory of São Caetano do Sul (*Centro de Estudos do Laboratório de Aptidão Física de São Caetano do Sul* - CELAFISCS).

In 2025, a global-scope document – “The 2025 report of the Lancet Countdown on climate change: climate change action offers a lifeline”,² shows, for example, that 84% of heatwave days between 2020–2024 wouldn't have occurred without climate change; an increase of 304% in elderly people exposure to heatwaves, compared to the period of 1986–2005; A worsening of the spread of infectious diseases, such as dengue fever; an increased food insecurity, whether due to the impact of droughts and/or floods on planting and/or production areas; and an increased pressure on health systems. This document mentions, as a global alert, the potential risks of PA during high heat and the fact that climate change might be another barrier to regular PA practice. For example, heat exposure significantly increased heat stress risk in people exercising outdoors in 2024, compared to the

1990s, which negatively impacts people's readiness for PA². Furthermore, a 2024 umbrella review highlights the interactions between PA and climate change³. Recently, a pre-print paper discussed the opportunities of a PA and climate change agendas approximation, proposing an important conceptual model of these interrelationships. Both documents demonstrate the recent relevance of the topic, the negative impacts of the climate on PA and, above all else, promising paths for planet sustainability through a synergism between these agendas⁴. The question imposed now is the urgency of reflection/action, parallel to the increasing necessity and growing sustainability agenda.

In Brazil, the National Institute of Meteorology points to a tendency of significant temperature increase between 1961 and 2024, with 2024 being the hottest year ever measured in the country ([Inmet Portal](#)). Data from the National Institute of Spatial Research shows that the number of heatwaves is expressively increasing. Compared to the period between 1961-1990, in the period between 2011-2020, there was about a $\approx 642\%$ increase in heatwave days ([Brazilian Ministry of Science, Technology and Innovation Portal](#)). The most recent report of the Intragovernmental Panel for Climate Change indicates that South America, especially in the lower latitudes, is one of the places under the biggest threat for the occurrence of heatwaves⁵.

Therefore, taking into account the negative impacts of climate change, either because of excessive rain and/or cold, or by the increase of heatwave occurrence and intensification of urban heat islands, we suggest that it is urgent that the area of PA revisits the PA recommendations in light of the new public health challenges. Given the vast body of theoretical knowledge regarding both the benefits of regular PA and the negative impacts of climate change, it is clear that there is no time to wait for the next update of the World Health Organization guidelines on PA, possibly in 2030. It is necessary to reflect, discuss, and act with the urgency that the climactic scenario demands. Understanding that the distribution of the PA practice time throughout the week is recommended, the National Institute of Spatial Research data cited above shows that, considering 52 days/year of heatwaves, we would have $\approx 15\%$ fewer days/year that could be considered more prone and healthy for PA, at least considering outdoor and not climatized environments. This means limiting even further the possibilities for safe PA for a significant portion of the population that doesn't

have access to climatized environments or to tree-lined open green spaces. Add to this the concern about the growing population over 65 years of age. This group deserves special attention regarding the necessity for regular PA practice because of its known benefits, for example, in regard to bone, musculoskeletal, and mental health. However, this same population has been experiencing an increase in morbidity and mortality indicators due to conditions linked to heat.

If, on one hand, intersectoral policies to increase active mobility should be encouraged, including more investment in transport infrastructure and safe and healthy outdoor physical activity practices for all, given their benefits for health, transport, air quality, reduction of pollutant emissions, etc.⁴, this positive expectation must be balanced with safety and health at the individual level. Therefore, in the current scenario, the PA recommendations could, for example, consider active transportation from the perspective of short distances, on days without extreme heat, made by choice, and on streets with good thermal protection (green and tree-lined spaces). On the other hand, important questions arise: are we promoting health to the thousands (or millions) who use active transportation due to a complete lack of options and who, therefore, must do it even on extremely hot days, on long and unshaded routes, such as those seen in urban centers? Would PA on extremely hot days be beneficial for elderly people without access to climatized environments or public facilities that could mitigate heat stress? Would we be promoting health by keeping physical education classes in schools under the sun, in environments lacking green spaces, and taking place, for example, between 10 am and 4 pm, during heat waves? All these questions must be reflected under the light of health inequities, considering that, in general, the less active populations are also the most vulnerable to climate change effects.

It is important to make clear that this call to reflection/action, influenced by the COP-30 and substantiated in the current climactic scenario, does not represent any opposition to the PA recommendations for health, as they are based on robust scientific evidence. Equally, it does not mean any opposition to the concept of "every movement counts", that, respecting the social determinants of health and the differences between PA performed by choice or by obligation, aims to highlight the health benefits that can be achieved even when the accumulated PA is less than the recommended minimum. This is simply, but urgently, a call

to action so that the PA guidelines begin to consider the urgency of the current climactic scenario, and reinforcement for the PA field to deepen the understanding of the interrelationships between climate change and PA^{3,4}. This means, for example, considering the negative impacts of the climactic emergencies both in the frequency as well as the safety of PA, incorporating, for example, caveats and orientations so that: 1 – managers and policy makers know the necessity of implementing intersectoral policies that make air quality better and give more access to adequate public spaces for PA; 2 – It is worth considering that the pandemic of physical inactivity tends to worsen in the context of extreme weather events; 3 – The population and institutions become increasingly more empowered to make decisions regarding the safety of the practice in the context of climate change. Therefore, we suggest that the current PA guidelines incorporate, immediately, in bulletins and/or addenda to the main documents, the necessary caveats needed to reconcile current PA guidelines with the increasing health risks associated with climate emergencies. Of course, the ideal, necessary, and most important thing is for humanity to manage to curb climate change and ensure the planet's sustainability for everyone. However, the current situation calls for immediate reflection and action on climate adaptation and resilience, also in the field of PA. Maybe, for heatwave days or periods, we can, for example, highlight the benefits of low-intensity PA, and relativize the weekly goal of 150 minutes, and/or emphasize the recommendation to reduce sedentary behavior? The solutions must be varied and a result of collective reflections and research. This paper, therefore, addresses a call for the necessary compatibility between the current climate emergency scenario and current guidelines for PA and health.

Conflict of interest

The authors declare no conflict of interest.

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Author's contributions

Porto LGG: Conceptualization; Methodology; Supervision; Project administration; Writing – original draft; Writing – review & editing; Approval of the final version. Porto BL: Conceptualiza-

tion; Writing – original draft; Writing – review & editing; Approval of the final version. Gurgel H and Matsudo VKR: Conceptualization; Writing – review & editing; Approval of the final version. Costa L: Conceptualization; Supervision; Project administration; Writing – review & editing; Approval of the final version.

Declaration regarding the use of artificial intelligence tools in the article writing process

The authors did not use artificial intelligence tools for the preparation of the manuscript.

Availability of research data and other materials

The contents will be available at the time of publication of the article.

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Reviewers' assessment

The reviews of this article were originally conducted in Portuguese. This version has been translated using ChatGPT and subsequently reviewed by the Chief Editors.

Reviewer A

Douglas Roque Andrade 

University of São Paulo, School of Arts, Sciences and Humanities, São Paulo, São Paulo, Brazil.

For the author and editor

I congratulate the author on submitting this letter, which addresses a relevant and urgent topic. I suggest mentioning that the theme was discussed during the most recent Brazilian Congress of Physical Activity and Health (*Congresso Brasileiro de Atividade Física e Saúde – CBAFS*). The letter appears under the author's article title, but even if it did not, I would know the source, as I had the privilege of attending the lecture. I see no problem with this, especially since it is an opinion piece, albeit one with substantial critical analysis and scientific grounding.

Final recommendation (decision)

- Accept

Reviewer B

Guilherme Stefano Goulardins 

University of São Paulo, School of Public Health, São Paulo, Brazil.

- Was any indication of plagiarism observed in the manuscript?
No
- Did the authors provide clarification regarding the ethical procedures adopted for conducting the research?
Not applicable

Comments to the Authors

- First, I congratulate the authors on the initiative to raise and bring attention to a topic of utmost importance in today's context. It is crucial that all areas of health begin to carefully observe and study the consequences of climate change. Second, I commend the authors on the quality of the work, which is very well written and invites the reader to reflect on the current scenario we are experiencing. I believe that valuing the recommendations of the Physical Activity Guidelines for the Brazilian Pop-

ulation is a crucial and highly appropriate aspect of this article.

- I understand the limitation regarding the number of references typically allowed for this type of manuscript. However, I would like to invite the authors to reflect—just as they have already done very well on the concept of physical activity by choice versus necessity—on the possibility of incorporating the updated concept of physical activity proposed by Professor Pedro C. Hallal and colleagues in the article “The future of physical activity: from sick individuals to healthy populations.” I believe that including this perspective could further enrich the discussion presented in this manuscript.
- On page 4, line 5, the authors discuss and appropriately present a sound recommendation. I would like to offer a reflection: it may be interesting to connect this recommendation to the concept of the first and last mile and present it as a suggestion for expanding and improving public transportation, such as increasing fleet sizes and implementing fare-free public transport policies.
- In addition, I offer one final reflection: the authors could further deepen and emphasize how the impacts of climate change disproportionately affect populations that are more vulnerable in terms of income—those who have limited access to leisure-time physical activity and who, under climate change scenarios, are likely to be even more adversely affected.
- Below are a few minor textual revisions offered as suggestions, which the authors may choose to adopt if they deem them necessary and appropriate:
- Page 1, line 17: Correct “...à luz no...” to “...à luz do...”.
- Page 2, lines 1 and 2: Correct spacing between words. I highlight these minor points only to assist in finalizing the text, as an external reviewer can sometimes notice small errors that may go unnoticed by those deeply involved in the work.
- Page 2, line 8: Revise and replace the sentence: “Although modestly, this document mentions, perhaps in a pioneering manner as a global warning, the potential risks of PA under increased heat con-

ditions and the fact that climate change may be yet another barrier to regular PA practice” with:
“Although modestly, this document mentions, perhaps in a pioneering manner as a global warning, the potential risks of PA under increased heat conditions and the fact that climate change can be yet another barrier to regular PA practice.”

- Page 4, line 20: Correct spacing.

- Page 5, line 13: Correct spacing.

Final recommendation (decision)

- Accept

Reviewer C

Did not authorize the publication of the review.