

Corresponding letter

The bold sedentary behavior recommendations in the new Canadian guidelines: are they evidence-based? Response to “Sedentary Behavior Research Network members support new Canadian 24-Hour Movement Guideline recommendations”

Emmanuel Stamatakis^{a,*}, Adrian E. Bauman^b

^a Charles Perkins Centre, Faculty of Medicine and Health, School of Health Sciences, University of Sydney, Sydney, NSW 2006, Australia

^b Charles Perkins Centre, Faculty of Medicine and Health, School of Public Health, Prevention Research Collaboration, University of Sydney, Sydney, NSW 2006, Australia

Received 15 September 2020; Accepted 19 September 2020

Available online 15 October 2020

2095-2546/© 2020 Published by Elsevier B.V. on behalf of Shanghai University of Sport. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Dear editor,

We read with interest the commentary by Mark Tremblay and colleagues,¹ which outlines the new 24-Hour Canadian sedentary behavior guidelines. These guidelines take the perspective of a continuum across the 24-h day, providing a vehicle for discussing physically active time, sitting and other sedentary time, as well as healthy sleep duration. The commentary¹ focuses on the sedentary behavior (SB) recommendations in these guidelines: (1) limiting sedentary time to ≤ 8 h per day, (2) limiting recreational screen time to ≤ 3 h, and (3) breaking up long periods of sitting as often as possible throughout the day. Support for this perspective was evidenced by a survey of a sample ($n = 126$, 6% of total) of Sedentary Behavior Research Network (SBRN) members² indicating broad acceptance of these SB recommendations.¹ In this response, we put this survey in context and discuss the evidence base underpinning these 3 Canadian sedentary-behavior recommendations.¹

What is unsurprising?

The majority (52%) of the SBRN survey responders strongly agreed with the SB recommendations. This is unsurprising because the new guidelines are heavily oriented toward SB, being the only adult guidelines that include 3 separate recommendations, with 2 nominating specific time thresholds. One would expect strong support from respondents from a

specialist SB network and the added stature to this area that these quantitative SB guidelines might assume.

What is surprising?

From the SBRN specialist network, it was somewhat surprising that nearly 20% of respondents did not agree with the framing of the new Canadian SB guidelines. We speculate that this disapproval is related to the SB evidence gaps we have previously discussed,³ and we further elaborate below.

Similarities to and differences from other guidelines

Several countries have included (non-quantitative) recommendations on SB in their public health guidance,³ including Australia, Germany, Finland, USA, UK, Norway, and the Netherlands. Arguably, the most authoritative national guidelines to date are the 2018 Physical Activity Guidelines for Americans (PAGA18).^{4,5} PAGA18 included a generic/non-quantitative recommendation to “sit less throughout the day”.⁵ There was insufficient evidence for breaking up sedentary time;⁴ and no screen-time-specific recommendation was made.

Considering that the PAGA18 reviews directly informed the Canadian guidelines,⁶ the evidence has been interpreted markedly differently for these 3 specific SB guidelines.¹ Competing interpretations of the same information may be deleterious to the communication of guidelines for all approaches (24-h guidelines or otherwise) because they can cause general public and practitioner confusion and may result in reduced scientific credibility for evidence regarding the spectrum of movement and health.

Peer review under responsibility of Shanghai University of Sport.

* Corresponding author.

E-mail address: emmanuel.stamatakis@sydney.edu.au (E. Stamatakis).

Insufficient evidence: the new norm?

We highlight some points surrounding the evidence used to develop the 3 SB recommendations:^{6,7}

1. Most SB evidence reviewed by the Canadian guidelines was from cross-sectional studies.⁶ As per established biomedical research conventions, cross-sectional evidence is appropriate for hypothesis generation for further testing in prospective observational and experimental studies. For example, neither PAGA18⁴ nor the forthcoming 2020 World Health Organization global guidelines on physical activity and sedentary behavior⁸ considered cross-sectional evidence.
2. Further, cross-sectional evidence for SB recommendations is particularly problematic because of the potential for reverse causality, i.e., people with existing poorer health outcomes may be more sedentary as a result of their chronic ill health. Reverse causation inflates effect sizes in cross-sectional studies and can lead to spurious associations and a “shallow” evidence base.
3. In particular, observational evidence base for sedentary breaks was almost exclusively cross-sectional; several prospective studies that examined the association of sedentary breaks with mortality or incident disease found no association.^{9,10}
4. Although there are consistent associations between sedentary time and mortality outcomes,⁶ it is unclear how the 8 h/day total sedentary time threshold was derived. No dose–response systematic reviews were included in the guidelines’ overview of SB evidence.⁶ The 3 dose–response meta-analyses^{11–13} cited in the commentary¹⁴ reported different daily thresholds for harmful sedentary time, e.g., 7 h (primarily self-reported sitting),⁷ 9.5 h (waist accelerometry studies),¹³ or 6 h (self-reported sitting).⁶
5. It is also unclear how the 3 h/day recreational screen time threshold was derived because no dose–response systematic reviews were identified.⁶ Also, most recreational screen-time evidence used TV viewing time, an exposure that is subject to multiple sources of measured and unmeasured confounding³ and that is unlikely to be causally associated with prospective health outcomes.¹⁵

Some of the above gaps are acknowledged in the SB evidence summary.⁶ However, we believe that loose adherence to the evaluation of evidence, in particular the weight assigned to cross-sectional studies, may contribute to a lowering of public health evidence standards. In this, Canadian 24-Hour Guidance, including cross-sectional contributions, may fall below acceptable scientific evidence thresholds. Tremblay and colleagues¹ acknowledge the “very low-quality evidence” but defend it using a January 2020 commentary by Neumann and Schünemann.¹⁶ We note that Neumann and Schünemann¹⁶ discussed clinical practice guidelines for medical interventions aimed at groups of patients, not public health population-level guidance as is implied in these Canadian

guidelines; e.g., the argument that “clinicians strongly prefer having recommendations in the context of uncertainty” is less relevant here.

24-h evidence to back 24-h guidelines

This field could be better informed by further development of compositional analytic evidence that concurrently measures sedentary behavior alongside sleep and light, moderate, and vigorous physical activity. There is an urgent research need for the development of robust 24-h guidelines. The 24-h compositional evidence review in the Canadian guidelines⁶ included 8 studies, of which 7 were cross-sectional. The lack of prospective compositional evidence is less than ideal.

Conclusion

Public health guidelines raise community and professional awareness, set behavioral targets for interventions, and act as a yardstick for health surveillance. In the absence of a consistent evidence base, it is unclear which of these functions the new bold and specific Canadian 24-Hour sedentary behavior guidelines serve. On the other hand, such specificity poses a risk of causing confusion among the general public and health professionals and further obfuscating already complex surveillance systems. We hope that users of these guidelines will approach them favorably, but critically, and that future guidelines developers will re-appraise the evidence and not uncritically adopt such approaches for “fear of missing out”.

Authors’ contributions

ES drafted and redrafted the manuscript; AEB revised the manuscript critically and approved of the final version before submission. Both authors have read and approved the final version of the manuscript, and agree with the order of presentation of the authors.

Competing interests

ES co-chairs the 2020 World Health Organization physical activity and sedentary behavior Guidelines Development Group and led the adult physical activity recommendations subcommittee; he was in the consensus group that developed the 2020 British Association of Sport and Exercise Sciences physical activity recommendations. AEB co-wrote the Australian 2014 Adult Physical Activity Guidelines and advised on earlier physical activity guideline and guidance development in several countries, including in the Asia-Pacific region and through the World Health Organization.

References

1. Tremblay MS, Rollo S, Saunders TJ. Sedentary Behavior Research Network members support new Canadian 24-Hour Movement Guideline recommendations. *J Sport Health Sci* 2020;**9**:479–81.
2. Sedentary Behavior Research Network. *Member Directory*. Available at: <https://www.sedentarybehaviour.org/member-directory/>. [accessed 14.09.2020].

3. Stamatakis E, Ekelund U, Ding D, Hamer M, Bauman A, Lee IM. Is the time right for quantitative public health guidelines on sitting? A narrative review of sedentary behaviour research paradigms and findings. *Br J Sports Med* 2019;**53**:377–82.
4. United States Physical Activity Guidelines Advisory Committee. *2018 Physical Activity Guidelines Advisory Committee Scientific Report*. Washington, DC: U.S. Department of Health and Human Services; 2018.
5. Piercy KL, Troiano RP, Ballard RM, Carlson SA, Fulton JE, Galuska DA, et al. The Physical Activity Guidelines for Americans. *JAMA* 2018;**320**:2020–8.
6. Saunders TJ, McIsaac T, Douillette K, Gaulton N, Hunter S, Rhodes RE, et al. Sedentary behaviour and health in adults: an overview of systematic reviews. *Appl Physiol Nutr Metab* 2020;**45**(Suppl. 2):S197–217.
7. Ross R, Chaput J-P, Giangregorio LM, Janssen I, Saunders TJ, Kho ME, 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 Metab* 2020;**45**(Suppl. 2):S57–102.
8. World Health Organization. *Public consultation on the draft WHO Guidelines on physical activity and sedentary behaviour for children and adolescents, adults and older adults 2020*. Available at: <https://bit.ly/3c3r0t8>. [accessed 10.10.2020].
9. Cooper AR, Sebire S, Montgomery AA, Peters TJ, Sharp DJ, Jackson N, et al. Sedentary time, breaks in sedentary time and metabolic variables in people with newly diagnosed type 2 diabetes. *Diabetologia* 2012;**55**:589–99.
10. Jefferis BJ, Parsons TJ, Sartini C, Ash S, Lennon LT, Papacosta O, et al. Objectively measured physical activity, sedentary behaviour and all-cause mortality in older men: does volume of activity matter more than pattern of accumulation? *Br J Sports Med* 2019;**53**:1013–20.
11. Patterson R, McNamara E, Tainio M, Hérick de Sá T, Smith AD, Sharp SJ, et al. Sedentary behaviour and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: a systematic review and dose response meta-analysis. *Eur J Epidemiol* 2018;**33**:811–29.
12. Chau JY, Grunseit AC, Chey T, Stamatakis E, Brown WJ, Matthews CE, et al. Daily sitting time and all-cause mortality: a meta-analysis. *PLoS One* 2013;**8**:e80000. doi:10.1371/journal.pone.0080000.
13. Ekelund U, Tarp J, Steene-Johannessen J, Hansen BH, Jefferis B, Fagerland MW, et al. Dose–response associations between accelerometry measured physical activity and sedentary time and all cause mortality: systematic review and harmonised meta-analysis. *BMJ* 2019;**366**:14570. doi:10.1136/bmj.14570.
14. Treuth MS, Butte NF, Adolph AL, Puyau MR. A longitudinal study of fitness and activity in girls predisposed to obesity. *Med Sci Sports Exerc* 2004;**36**:198–204.
15. Hamer M, Ding D, Chau J, Duncan MJ, Stamatakis E. Association between TV viewing and heart disease mortality: observational study using negative control outcome. *J Epidemiol Commun Health* 2020;**74**:391–4.
16. Neumann I, Schünemann HJ. Guideline groups should make recommendations even if the evidence is considered insufficient. *CMAJ* 2020;**192**:E23–4.