



Applied Physiology, Nutrition, and Metabolism  
Physiologie appliquée, nutrition et métabolisme

**Canadian physical activity guidelines for adults: are Canadians aware?**

Journal:	<i>Applied Physiology, Nutrition, and Metabolism</i>
Manuscript ID	apnm-2016-0115.R1
Manuscript Type:	Brief communication
Date Submitted by the Author:	28-Apr-2016
Complete List of Authors:	Pfaeffli Dale, Leila; University of British Columbia, School of Kinesiology LeBlanc, Allana; ParticipACTION Orr, Krystn ; University of Toronto Berry, Tanya; University of Alberta Deshpande, Sameer; University of Lethbridge, Latimer-Cheung, Amy; Queens University, O'Reilly, Norm; Ohio University, 8Department of Sports Administration Rhodes, Ryan; University of Victoria, Tremblay, Mark; Childrens Hospital of Eastern Ontario Research Institute, Faulkner, Guy; University of British Columbia, Kinesiology
Keyword:	public health, physical activity < exercise, guidelines, awareness, knowledge translation

SCHOLARONE™  
Manuscripts

Running Head: Canadian Physical Activity Guideline Awareness

1

*Title page*

*Type of Research:* Brief communication

*Title:* Canadian physical activity guidelines for adults: are Canadians aware?

*Authors:*

<sup>1</sup>Leila Pfaeffli Dale

<sup>2</sup>Allana G. LeBlanc

<sup>3</sup>Krystn Orr

<sup>4</sup>Tanya Berry

<sup>5</sup>Sameer Deshpande

<sup>6</sup>Amy E. Latimer-Cheung

<sup>7</sup>Norm O'Reilly

<sup>8</sup>Ryan E. Rhodes

<sup>9</sup>Mark S. Tremblay

<sup>1</sup>Guy Faulkner

*Affiliations:*

<sup>1</sup>School of Kinesiology, University of British Columbia, Vancouver, BC

<sup>2</sup>ParticipACTION, Toronto, ON

<sup>3</sup>Faculty of Kinesiology and Physical Education, University of Toronto, Toronto, ON

<sup>4</sup>Faculty of Physical Education and Recreation, University of Alberta, Edmonton, AB

<sup>5</sup>Faculty of Management, University of Lethbridge, Lethbridge, AB

<sup>6</sup>School of Kinesiology and Health Studies, Queen's University, Kingston, ON

<sup>7</sup>Department of Sports Administration, Ohio University, Athens, OH, USA

<sup>8</sup>Behavioural Medicine Laboratory, University of Victoria, Victoria, BC

Canadian Physical Activity Guideline Awareness

2

<sup>9</sup>Healthy Active Living and Obesity Research Group, Children's Hospital of Eastern Ontario  
Research Institute, Ottawa, ON

*Corresponding author:*

Leila Pfaeffli Dale (leila.dale@ubc.ca)

*Abstract Word Count: 75*

*Manuscript Word Count: 3077*

Draft

**ABSTRACT**

The present study evaluated awareness of the 2011 Canadian Physical Activity (PA) Guidelines for Adults and assessed correlates. Reported awareness of the PA guidelines was 12.9% (204/1586) of the total sample surveyed. Over half (55%) self-reported meeting PA guidelines of  $\geq 150$  minutes of moderate-to-vigorous PA per week. Awareness of PA guidelines was significantly related to participants' level of PA ( $\chi^2(1) = 30.63, p < .001, \phi = -.14$ ), but not to any demographic variables.

**KEY WORDS:** Public health; physical activity; guidelines; knowledge translation; awareness

Draft

## INTRODUCTION

Physical activity (PA) guidelines serve as health communication tools to educate Canadians on the amount of PA necessary for health promotion and disease prevention and to encourage greater PA participation (Cameron et al. 2007; Warburton et al. 2010). An updated edition of the Canadian Physical Activity Guidelines for Adults was released in 2011 by the Canadian Society for Exercise Physiology (CSEP)<sup>1</sup>, with the support (e.g., development, dissemination) of the Public Health Agency of Canada (PHAC)<sup>2</sup>, ParticipACTION<sup>3</sup>, and the Healthy Active Living and Obesity Research Group<sup>4</sup>. A rigorous process was undertaken to develop the recommendations, first by identifying the key knowledge gaps in previous guidelines and addressing these gaps using the best available evidence (Tremblay et al. 2011).

The current guidelines include a larger age range (18-64 years) compared to previous guidelines (20-55 years), and include more detail on the intensity and type of recommended PA, which was not specified in previous guidelines. The recommended amount of time spent on PA changed from 60 minutes per day to 150 minutes per week, to allow individuals greater flexibility to build PA into their schedules (Tremblay et al. 2011). The current PA guidelines for adults state that:

“To achieve health benefits, adults aged 18–64 years should accumulate at least 150 min of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 min or more. It is also beneficial to add muscle- and bone-strengthening activities that use major muscle groups, at least 2 days per week. More physical activity provides greater health benefits” (Tremblay et al. 2011).

The PA guidelines launch was under resourced which, in turn, limited dissemination (Latimer-Cheung et al. 2013). Notably, limited dissemination was found in organizational

---

<sup>1</sup> Canadian Society for Exercise Physiology: <http://csep.ca/home>

<sup>2</sup> Public Health Agency of Canada: <http://www.phac-aspc.gc.ca>

<sup>3</sup> ParticipACTION: <http://www.participaction.com>

<sup>4</sup> Healthy Active Living and Obesity Research Group: <http://www.haloresearch.ca/>

## Canadian Physical Activity Guideline Awareness

uptake, where only 51% of organizations with an interest in promoting PA had posted the guidelines on their websites within nine months of their release (Gainforth et al. 2013). If guidelines are to play a role in public health initiatives to promote physical activity, then presumably awareness of their existence is necessary. The diffusion of innovation theory suggests that awareness of an innovation (e.g., the guidelines) is the first step in the decision to adopt and implement the innovation (e.g., communicating the guidelines to patients; Rogers 2010).

Historically, guideline awareness, or knowledge that the guidelines exist, has typically been low. Evaluations of previous Canadian PA guidelines, released in 1998, found that only 4% (unprompted) and 37% (prompted) were aware of the PA guidelines (Cameron et al. 2007). Similar results were found in the western Canadian province of Alberta, where awareness was 20.7% (prompted) among Albertan adults (Spence et al. 2002). A recent review examined the awareness of Canadian PA guidelines from various sources, including data from health organizations such as PHAC, ParticipACTION, and from scientific databases (LeBlanc et al. 2015). The authors found that awareness of the guidelines was low, particularly during unprompted questioning, and noted that most of the included work had been conducted on the awareness of children/youth PA guidelines, while awareness of the current PA guidelines for adults had yet to be investigated (LeBlanc et al. 2015). Therefore, the purpose of this study was to assess awareness of the most recent 2011 Canadian PA guidelines for adults and examine the correlates of that awareness, including level of PA participation and various demographic characteristics. This study is timely given that the adult guidelines are due to be updated in 2017 (CSEP 2012). Identifying awareness of the current guidelines before this update should inform future dissemination and evaluation plans.

## METHODS

Recruitment was conducted through the Angus Reid Forum, an online consumer panel consisting of over 125,000 Canadians. The typical survey response rate for the forum is 25-35%. Participants for this study were Canadian adults (aged 18+ years) who had previously self-selected to sign up to the Angus Reid Forum, and were then randomly selected from the forum for the purposes of a larger ParticipACTION campaign evaluation. The campaign was not related to the adult physical activity guidelines.

A total of 1,586 participants were recruited from across Canada. Approximately half of the sample were from the general Canadian population ( $n=767$ ; English,  $n=618$ ; French,  $n=149$ ) and half were mothers with children aged 5-11 years ( $n=809$ ; English,  $n=656$ ; French,  $n=153$ ). The general Canadian population sample was weighted to reflect the overall Canadian demographic population (using Census data) by gender, age and region, whereas the sample of mothers was weighted by region only. Oversamples of mothers from British Columbia ( $n = 203$ ), Newfoundland ( $n = 45$ ) and Nova Scotia ( $n = 100$ ) were included since they were the target audience of an ongoing ParticipACTION campaign. The margin of error for a sample of this size is  $\pm 3.4\%$ , 19 times out of 20 ( $\pm 3.8\%$  for English,  $\pm 7.9\%$  for French). Data collection occurred between April 1<sup>st</sup> and 13<sup>th</sup>, 2015 by Vision Critical (an external data collection and analysis company), and secondary data analysis for the purposes of this study occurred in February, 2016.

### Measures

**Awareness.** A single item question addressed awareness of the PA guidelines which was aligned with Cameron et al.'s prompted recall of awareness (Cameron et al. 2007). Participants were asked, "*Have you heard of the Canadian Physical Activity Guidelines for Adults announced in*

Canadian Physical Activity Guideline Awareness

*January 2011?*” Responses included “yes”, “no”, and “not sure” with responses of *no* or *not sure* being collapsed into one category.

**Demographics.** Participants were asked to provide their demographic information including: gender, age, parental status (yes or no), education (high school or less vs. post-secondary), income level, and their province of residence. Reflecting the distinct guidelines for adults and older adults, age was sub-divided into adults (aged 18-64 years) and seniors (aged 65+ years).

**Physical Activity.** Participants were asked to self-report their moderate-to-vigorous PA by weekday and weekend day (“*How many minutes are you physically active [all the time you spent in activities that increased your heart rate and made you breathe hard]?*”). Total weekday minutes of PA were calculated by multiplying the number of active minutes (if  $\geq 10$ ) on a weekday by 5. Total weekend minutes of PA were calculated multiplying the number of active minutes (if  $\geq 10$ ) on a weekend day by 2. These were added together to determine the total minutes of PA per week. If this number was greater than 150 minutes per week, participants were classified as meeting current guidelines.

### **Data Analysis**

All data analysis was conducted using SPSS version 23.0 (Armonk, NY: IBM Corp.). Descriptive statistics were calculated using frequencies for categorical variables and means (standard deviations) for continuous variables. The relationships between variables (i.e. awareness, PA level, gender, age, parental status, education, income, and province) were determined using Chi-squared tests. All statistical tests were 2-tailed at a 5% significance level.

## **RESULTS**

The participants (N=1,586) who took part in the study were predominantly female (1226/1586; 77.3%) with a mean age of 44.1 years ( $\pm 12.7$  years). The sample included 1,450

adults (79% female; age 41.5 [ $\pm$  9.79] years) and 136 older adults (65+ years of age; 59% female; age 71.6 [ $\pm$  5.39] years). Self-reported minutes of PA per week ranged from 0-3,360 minutes/week ( $M= 226.7 \pm 273.7$  minutes/week). Over half of the sample (865/1,586; 55%) reported meeting PA guidelines of  $\geq 150$  minutes of PA per week accumulated in bouts of 10 minutes or more. Demographic characteristics can be found in table I.

[INSERT TABLE I]

Overall, awareness of the 2011 Canadian PA Guidelines for Adults was low (12.9%). No relationships were found between any demographic variable and PA guideline awareness (see Table II). A significant positive relationship was found between awareness of PA guidelines and meeting PA guidelines ( $\chi^2 (1) = 30.63, p < .001, \phi = .14$ ).

[INSERT TABLE II]

## DISCUSSION

This study was the first known evaluation of the Canadian PA Guidelines for Adults since their release in 2011. Findings revealed that only 12.9% of Canadian adults sampled were aware of the PA guidelines. No relationships were found between awareness of PA guidelines and any demographic variables. The low levels of awareness were similar to evaluations of earlier PA guidelines in Canada (Cameron et al. 2007; Spence et al. 2002), as well as in the United Kingdom (Knox et al. 2015) and the United States (Kay et al. 2014). Contrary to the current findings, both previous evaluations of the 1998 Canadian PA guidelines found greater awareness among women and those with higher levels of education (Cameron et al. 2007; Spence et al. 2002). It may be that the lack of relationships found between demographic variables and awareness occurred due to limitations in the sample, such as an under-representation of males. In general, however, the majority of Canadians, irrespective of age,

## Canadian Physical Activity Guideline Awareness

gender, parental status, and education, were not aware of the current PA guidelines, suggesting the dissemination and promotion was less than optimal.

The dissemination of the current PA guidelines was conducted through mass media campaigns, including web, print, television, and radio (LeBlanc et al. 2015). Unfortunately, there was a lack of a sustained and funded approach to the knowledge translation of the current PA guidelines (Latimer-Cheung et al. 2013), which may explain low awareness. Further consideration is needed as to the future strategy for disseminating the guidelines to Canadians and in identifying the most effective methods of communicating the guidelines. More substantial and sustained efforts by multi-sectoral partners (e.g., fitness and physical activity, public health, healthcare, occupational health, recreation, sport) through an integrated marketing and communications strategy would improve the likelihood of increased awareness, knowledge and understanding, uptake, and possible activation of the guidelines. If resources are to be invested in revising the adult guidelines in 2017 then more focused attention must be given to their dissemination, and the evaluation of those dissemination efforts. Without appropriate resourcing for dissemination then the role of physical activity guideline development needs reconsideration.

Notably, awareness levels of the guidelines were associated with increased self-reported PA participation. The cross-sectional design and measurement limitations preclude the ability to conclude that awareness led to increased PA. Awareness of the guidelines is likely not enough to change behaviour alone, yet it may be needed for individuals to make decisions about their health (Kay et al. 2014). Several health communication theories suggest that awareness is a precursor to a cascade of cognitions that lead to behaviour change (McGuire 1984; Rogers 2010).

In addition to dissemination, effort must be put forth to persuade people to adopt the guidelines (Rogers 2010). Once aware of the guidelines, Canadians need to be knowledgeable of what the guidelines recommend, and motivated to meet the guidelines, as individual and environmental factors also influence behaviour. This should be accomplished through a systematic, multi-level approach which includes efforts to change how people think about the guidelines (Latimer et al. 2010), and how environments and policies support people to meet the guidelines (Michie et al. 2011).

### **Limitations and Future Directions**

The study recruited participants from all ten Canadian provinces and three territories; however, no one from the territories took part. Males were underrepresented in the sample given the nature of the larger study (i.e., oversampling of mothers). The participants in this study also self-selected to join the Angus Reid Forum, and therefore may not be representative of all Canadians. Additionally, given that the study was part of a larger evaluation, there may be other important correlates of awareness not assessed. The question concerning the guidelines may have also been limited. For instance, some participants may have answered “no” to the awareness item because they did not know what the guidelines were called, but may have known that they should be engaging in at least 150 minutes of PA per week. Future studies could ask two-part question to determine awareness and knowledge or understanding of the guidelines.

Minutes of PA were self-reported, which has been well documented as a source of measurement error, suffering from social desirability bias and recall bias (Helmerhorst et al. 2012). To highlight the potential inconsistency of the self-reported measures, 55% of participants reported meeting the PA guidelines in this study, while an objectively measured, nationally representative sample (N=5,700) reported that only 20% were meeting the PA guidelines

## Canadian Physical Activity Guideline Awareness

(Statistics Canada 2015). Future studies exploring relationships between awareness of guidelines and PA participation should be conducted with larger, more representative samples, using objective measures of PA. In the future, it would be prudent to examine awareness as a determinant of meeting the PA guidelines in addition to other individual and environment-level determinants. Future iterations of the Canadian Health Measures Survey could include a question regarding awareness of PA guidelines to provide a better understanding of this relationship.

### Conclusion

Due to the low awareness of the PA guidelines, it is necessary to rethink how dissemination and promotion was conducted, particularly given the national dissemination plan that was initially included in the PA guidelines' development (Tremblay et al. 2011). Greater emphasis on marketing and communicating the guidelines may help to increase awareness. Additional PA opportunities and supportive policies will also be needed to activate the guidelines to increase PA participation among Canadian adults.

### Acknowledgements

Guy Faulkner is supported by a Canadian Institutes of Health Research-Public Health Agency of Canada (CIHR-PHAC) Chair in Applied Public Health. Tanya Berry and Amy Latimer-Cheung are funded by the Canada Research Chair Program. The authors report no conflicts of interest.

### References

- Cameron, C., Craig, C. L., Bull, F. C., & Bauman, A. 2007. Canada's physical activity guides: has their release had an impact? *Appl. Physiol. Nutr. Metab.* 32(Suppl. 2E): S161–169.
- Canadian Society for Exercise Physiology (CSEP). 2012. Canadian Physical Activity Guidelines

- for the Early Years (aged 0-4 years): Clinical Practice Guideline Development Report. Retrieved from <http://www.csep.ca/view.asp?ccid=522>.
- Gainforth, H. L., Berry, T., Faulkner, G., Rhodes, R. E., Spence, J. C., Tremblay, M. S., et al. 2013. Evaluating the uptake of Canada's new physical activity and sedentary behavior guidelines on service organizations' websites. *Transl Behav Med.* 3(2): 172–179.
- Helmerhorst, H. J., Brage, S., Warren, J., Besson, H., & Ekelund, U. 2012. A systematic review of reliability and objective criterion-related validity of physical activity questionnaires. *Int J Behav Nutr Phys Act.* 9(1): 103–57.
- Kay, M. C., Carroll, D. D., Carlson, S. A., & Fulton, J. E. 2014. Awareness and knowledge of the 2008 physical activity guidelines for Americans. *Journal of Physical Activity & Health.* 11(4): 693–698.
- Knox, E. C., Musson, H., & Adams, E. J. 2015. Knowledge of physical activity recommendations in adults employed in England: associations with individual and workplace-related predictors. *Int J Behav Nutr Phys Act.* 12(1): 69.
- Latimer, A. E., Brawley, L. R., & Bassett, R. L. 2010. A systematic review of three approaches for constructing physical activity messages: what messages work and what improvements are needed? *Int J Behav Nutr Phys Act.* 7(1): 36.
- Latimer-Cheung, A. E., Rhodes, R. E., Kho, M. E., Tomasone, J. R., Gainforth, H. L., Kowalski, K., et al. 2013. Evidence-informed recommendations for constructing and disseminating messages supplementing the new Canadian Physical Activity Guidelines. *BMC Public Health.* 13(1): 1.
- LeBlanc, A. G., Berry, T., Deshpande, S., Duggan, M., Faulkner, G., Latimer-Cheung, A. E., et al. 2015. Knowledge and awareness of Canadian Physical Activity and Sedentary

## Canadian Physical Activity Guideline Awareness

- Behaviour Guidelines: a synthesis of existing evidence. *Appl. Physiol. Nutr. Metab.* 40(7): 716–724.
- McGuire, W. J. 1984. Public communication as a strategy for inducing health-promoting behavioral change. *Preventive Medicine.* 13(3): 299–319.
- Michie, S., van Stralen, M. M., & West, R. 2011. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation Science.* 6(1): 42.
- Rogers, E. M. 2010. *Diffusion of innovations.* Simon and Schuster, New York, NY.
- Spence, J. C., Plotnikoff, R. C., & Mummery, W. K. 2002. The awareness and use of Canada's physical activity guide to healthy active living. *Canadian Journal of Public Health/Revue Canadienne de Sante'e Publique:* 394–396.
- Statistics Canada. 2015. Canadian Health Measures Survey: Directly measured physical activity of Canadians, 2012 and 2013. Retrieved from <http://www.statcan.gc.ca/daily-quotidien/150218/dq150218c-eng.htm>
- Tremblay, M. S., Warburton, D. E. R., Janssen, I., Paterson, D. H., Latimer, A. E., Rhodes, R. E., et al. 2011. New Canadian Physical Activity Guidelines. *Appl. Physiol. Nutr. Metab.* 36(1): 36–46.
- Warburton, D. E., Charlesworth, S., Ivey, A., Nettlefold, L., & Bredin, S. S. 2010. A systematic review of the evidence for Canada's Physical Activity Guidelines for Adults. *Int J Behav Nutr Phys Act.* 7(1): 39.

**Table I.** Demographic characteristics of participants

		All ( <i>N</i> = 1,586)
Age, M (SD)		44.06 ± 12.71
Gender, <i>n</i> (%)		
	Male	360 (22.7)
	Female	1,226 (77.3)
Province, <i>n</i> (%)		
	Alberta	138 (8.7)
	British Columbia	304 (19.2)
	Manitoba	46 (2.9)
	New Brunswick	40 (2.5)
	Newfoundland	58 (3.7)
	Nova Scotia	123 (7.8)
	Ontario	489 (30.8)
	Prince Edward Island	4 (0.3)
	Quebec	341 (21.5)
	Saskatchewan	43 (2.7)
Education, <i>n</i> (%)		
	High School or less	266 (16.8)
	Post-secondary	1,320 (83.2)
Income, <i>n</i> (%)		
	Less than \$25,000	158 (10.0)
	\$25,000-\$75,000	591 (37.3)
	\$75,000-\$150,000	578 (36.4)
	\$150,000 or more	236 (14.9)
	Prefer not to answer	23 (1.5)
Parental status, <i>n</i> (%)		
	Yes	632 (39.8)
	No	954 (60.2)
Meeting physical activity guidelines, <i>n</i> (%)		
	Yes (active)	865 (54.5)
	No (Inactive/somewhat active/not sure)	721 (45.5)
Aware of physical activity guidelines, <i>n</i> (%)		
	Yes	204 (12.9)
	No	1,382 (87.1)

**Table II.** Correlates of awareness of physical activity guidelines

	Awareness, % ( <i>n</i> ) yes	Significance
Meeting physical activity guidelines	Yes 17.1 (148) No 7.8 (56)	$\chi^2 (1) = 30.63, p < .001, \phi = -.14$
Age	Adult (18-64 years) 12.8 (185) Older Adult (65+ years) 14.0 (19)	$\chi^2 (1) = .16, p = .69$
Gender	Male 11.1 (40) Female 13.4 (164)	$\chi^2 (1) = 1.28, p = .26$
Parental status	Yes 12.6 (120) No 13.3 (84)	$\chi^2 (1) = .17, p = .68$
Education	High School or less 9.4 (25) Post-Secondary 13.6 (179)	$\chi^2 (1) = 3.42, p = .06$
Income	Less than \$25,000 11.4 (18) \$25,000-\$75,000 11.7 (69) \$75,000-\$150,000 13.8 (80) \$150,000 or more 15.3 (36) Prefer not to answer 4.3 (1)	$\chi^2 (4) = 4.23, p = .38$
Province	Alberta 10.9 (15) British Columbia 11.8 (36) Manitoba 10.9 (5) New Brunswick 17.5 (7) Newfoundland 15.5 (9) Nova Scotia 13.8 (17) Ontario 13.7 (67) Prince Edward Island 25.0 (1) Quebec 12.3 (42) Saskatchewan 11.6 (5)	$\chi^2 (9) = 3.15, p = .96$